



March 31, 2020

Project Name: North Boyer Development

Location: Sandpoint, ID – RPS00000150750A

RE: Trip Generation/Distribution Letter (TGDL), dated Feb. 13, 2020 (rec. Feb. 19, 2020)

The Trip Generation/Distribution Letter for the project referenced above, prepared by David Evans & Associates, Inc. (Coeur d'Alene, ID), dated February 13, 2020 was received via email on February 19, 2020, in association with the proposed North Boyer Development. The submittal was reviewed in accordance with City Code and the adopted Urban Area Transportation Plan (UATP).

Please revise and resubmit the TGDL in accordance with the following corrections and comments:

1. Trip Generation: please revise analysis to provide and thoroughly describe AM Peak, weekend peaks, ADT, and include seasonal analysis to account for the effect of Schweitzer Mountain resort trips on Boyer Ave compounded by school and commute trips. See Comments 5 and 6 for clarification regarding weekend and seasonal analysis.
2. Trip Reductions/Net New Trips: Table 1 reflects New Trips for the Mini-Warehouse and Shopping Center. Please add clarification in the New Trips general description to include these land uses.
3. Trip Distribution: update to account for AM Peak, weekend and seasonal peaks. Regarding Table 2, please clarify “Although the development may install crossings of the drainage channel, it was assumed no connection within the site is provided between the two halves for trip distribution purposes.” Specifically, is the developer proposing crossings and connection between the two halves? If so, please revise the assumption and distribution results.
4. Please clarify the purpose/value of two driveways on Boyer Ave.
5. Analysis relating to seasonal trip generations may apply to the following intersections:
 - Schweitzer Cutoff Road/Boyer Avenue
 - Mountain View Road/Boyer Avenue
 - Baldy Mountain Road/Boyer Avenue
 - Larch Street/Boyer Avenue
 - Baldy Mountain Road/Division Avenue
 - Larch Street/Division Avenue

6. Analysis relating to weekend trip generations may apply to the following intersections:
 - Schweitzer Cutoff Road/Boyer Avenue
 - Baldy Mountain Road/Boyer Avenue
 - Larch Street/Boyer Avenue
7. Consider if the inclusion of AM Peak necessitates an expansion of the study area, including but are not limited to the following intersections:
 - Division Avenue/Spruce Street
 - Division Avenue/Pine Street
 - Cedar Street/Boyer Avenue
 - Baldy Mountain Road/Great Northern Road

City Code 10-1-6.A.18 specifies that development contributing three hundred (300) or more vehicle trips per day to the city street system shall require a traffic impact analysis (TIA). Include the following:

1. Roadway Inventory
2. Traffic Counts
3. Accident History
4. Baseline Forecasts
5. Future Projections Analysis
6. Traffic/Intersection Operation Analysis (include turning movements assessments)
7. Pedestrian/Bicycle Analysis (within 600 feet of project)
8. Capacity Improvements
9. Queuing Analysis (include impact of pass-by trips and BNSF train delays)
10. Access Evaluation (Number & Spacing)
11. Summary and Conclusions
12. Mitigation Strategies

The City will provide other proposed land use actions that may influence the TIA, as available. Upon receipt of the TIA, the City will conduct an internal review and forward to other jurisdictions for comment, as applicable. A concurrency analysis may be required. Please allow approximately 30 business days for the initial review of the TIA.

City Staff Contact: Amanda Wilson, awilson@sandpointidaho.gov, 208.263.3411



May 14, 2020

Project Name: North Boyer Development

Location: Sandpoint, ID – RPS00000150750A

RE: Trip Generation/Distribution Letter (TGDL), dated April 21, 2020

The revised Trip Generation/Distribution Letter for the project referenced above, prepared by David Evans & Associates, Inc. (Coeur d'Alene, ID), dated April 21, 2020 was received via email on April 22, 2020, in association with the proposed North Boyer Development. The submittal was reviewed in accordance with City Code and the adopted Urban Area Transportation Plan (UATP).

The original submittal dated February 13, 2020 was reviewed by the City and returned for revision and resubmittal with the following corrections and comments:

1. Trip Generation: please revise analysis to provide and thoroughly describe AM Peak, weekend peaks, ADT, and include seasonal analysis to account for the effect of Schweitzer Mountain resort trips on Boyer Ave compounded by school and commute trips. See Comments 5 and 6 for clarification regarding weekend and seasonal analysis. **No further action is required.**
2. Trip Reductions/Net New Trips: Table 1 reflects New Trips for the Mini-Warehouse and Shopping Center. Please add clarification in the New Trips general description to include these land uses. **No further action is required.**
3. Trip Distribution: update to account for AM Peak, weekend and seasonal peaks. **No further action is required.** Regarding Table 2, please clarify “Although the development may install crossings of the drainage channel, it was assumed no connection within the site is provided between the two halves for trip distribution purposes.” **Revised TGDL excludes this assumption.** Specifically, is the developer proposing crossings and connection between the two halves? **No clarification provided.** The revised TGDL, Figure 2, Site Plan reflects connection within the site between the two halves; the TIA shall clarify if the analysis assumes a connection between the two halves is included or excluded.
4. Please clarify the purpose/value of two driveways on Boyer Ave. **No further action is required.**
5. Analysis relating to seasonal trip generations may apply to the following intersections:
 - Schweitzer Cutoff Road/Boyer Avenue
 - Mountain View Road/Boyer Avenue

- Baldy Mountain Road/Boyer Avenue
- Larch Street/Boyer Avenue
- Baldy Mountain Road/Division Avenue
- Larch Street/Division Avenue

No further action is required.

6. Analysis relating to weekend trip generations may apply to the following intersections:
 - Schweitzer Cutoff Road/Boyer Avenue
 - Baldy Mountain Road/Boyer Avenue
 - Larch Street/Boyer Avenue
7. Consider if the inclusion of AM Peak necessitates an expansion of the study area, including but are not limited to the following intersections:
 - Division Avenue/Spruce Street
 - Division Avenue/Pine Street
 - Cedar Street/Boyer Avenue
 - Baldy Mountain Road/Great Northern Road

No further action is required.

The City engaged an independent consultant to provide a peer review of the revised TGDL. A memorandum dated May 12, 2020, generated by Fehr & Peers, is enclosed for reference.

On May 7, 2020, the City received the TIA, developed by DEA, dated May 5, 2020. An independent peer review of the TIA will be conducted and the City will forward to other jurisdictions for comment, as applicable. As previously noted, please allow approximately 30 business days for the initial review of the TIA.

City Staff Contact: Amanda Wilson, awilson@sandpointidaho.gov, 208.263.3411

MEMORANDUM

Date: May 12, 2020
To: Amanda Wilson, City of Sandpoint
From: Christopher Bender, Fehr & Peers
Preston Stinger, Fehr & Peers
Subject: **North Boyer Development TGDL Review**

UT20-2221

INTRODUCTION

This technical memorandum summarizes Fehr & Peers' review of David Evans and Associates, Inc. (DE&A) Trip Generation and Distribution Letter (TGDL), dated April 21, 2020, for the proposed North Boyer Development in Sandpoint, Idaho. The review examines the TGDL to assess compliance with City Code, the Urban Area Transportation Plan (UATP), and industry standard practice.

This memorandum is in response to those materials and includes additional recommendations from Fehr & Peers regarding the trip generation and distribution for the proposed development. It should be noted that the recommendations are based on the data presented in the documents delivered to Fehr & Peers. Fehr & Peers did not collect any new data for this review.

PEER REVIEW

This section contains a summary of the aforementioned TGDL, alongside the results from Fehr & Peers' peer review of the strategies.

APRIL 2020 TRIP GENERATION & DISTRIBUTION LETTER FROM DE&A:

- **Project Location:** The TGDL describes the proposed development is to be located in the parcel on the east side of North Boyer Avenue between Baldy Mountain Road and Mountain View Road.
- **Project Action:** The TGDL assumes 133 single family dwelling units, 220 multifamily (low rise) dwelling units, 45,000 ft² of mini-warehouse use, and 10,000 ft² of retail shopping center space, as described by the applicant. Four driveways were assumed in the analysis as shown in the provided site layout.
- **Trip Generation:** The TGDL estimates trip generation based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition* as is industry standard practice.

- Trip generation was performed to estimate the weekday AM, weekday PM, and Saturday peak hour trips. Trip generation was also performed to estimate weekday and Saturday daily trips.
- It should also be noted that pass-by trips were accounted for in the weekday PM and Saturday peak hour trip calculations. The reductions used in both instances are based on the average pass-by trip percentage outlined in the *ITE Trip Generation Handbook, 3rd Edition*, as is industry standard practice.
 - While the pass-by trips were correctly calculated, Fehr & Peers reminds the reader that pass-by trips are not simply removed from the network in the analysis. Rather, they are diverted and still should be accounted for in a traffic impact study.
- While the proposed development does include multiple land uses, mixed-use development reductions were not accounted for due to the residential and retail uses being separated from each other in the development. This is likely a conservative and appropriate measure as accounting for mixed-use reductions would decrease the overall trip generation estimate.
- **Trip Distribution and Assignment:** The TGDL outlines trip distribution and assignment for the proposed North Boyer Development.
 - The TGDL states that the distribution and assignment were based on study intersection traffic counts and the Sandpoint Travel Demand Model.
 - The trips distributed to and from each of the driveways was based on the nearby land uses and are outlined in Figures 3-4 and Tables 6-7.

CONCLUSION

Fehr & Peers reviewed the TGDL performed by DE&A for the proposed North Boyer Development site in Sandpoint, Idaho. Fehr & Peers found that the trip generation and distribution calculations performed by DE&A were performed in keeping with industry standard practice and that the TGDL meets the guidelines in the UATP.

MEMORANDUM

Date: June 19, 2020
To: Amanda Wilson, City of Sandpoint
From: Christopher Bender, Fehr & Peers
Preston Stinger, Fehr & Peers
Subject: **North Boyer Development TIS Review**

UT20-2221

INTRODUCTION

This technical memorandum summarizes Fehr & Peers' review of David Evans and Associates, Inc. (DE&A) Traffic Impact Study (TIS), dated May 5, 2020, for the proposed North Boyer Development in Sandpoint, Idaho. The review examines the TIS to assess compliance with City Code, the Urban Area Transportation Plan (UATP), and industry standard practice.

This memorandum also includes additional recommendations from Fehr & Peers regarding the operations analysis of the road network surrounding the proposed development. It should be noted that the recommendations are based on the data presented in the documents delivered to Fehr & Peers. Fehr & Peers did not collect any new data for this review.

PEER REVIEW OF THE MAY 2020 TIS FROM DE&A:

- **Project Introduction:**

- *Location:* The TIS describes the proposed development to be located at the parcel on the east side of North Boyer Avenue between Baldy Mountain Road and Mountain View Road.
- *Land Use & Zoning:* The TIS assumes 133 single family dwelling units, 150 multifamily (low rise) dwelling units, 45,000 ft² of mini-warehouse use, and 10,000 ft² of retail shopping center space, as described by the applicant.
- *Access:* Four driveways were assumed in the analysis as shown in the provided site layout – two connecting to Mountain View Road and two connecting to North Boyer Avenue.
- *Methodology & Assumptions:* Analysis was performed based on the HCM 6 methodology using Synchro 10 software at the signalized and stop-controlled intersections. Analysis for the roundabout intersections was based on the HCM 2000 methodology using Sidra 8

software. The analysis was performed for existing (2020), opening year (2025), and one horizon year (2030).

- **Roadway Inventory:** The TIS includes accurate descriptions (roadway classification, speed limits, number of lanes, etc.) of the following primary roadways in the study area: North Boyer Avenue, Mountain View Road, Baldy Mountain Road, Larch Street, Division Avenue, Schweitzer Cutoff Road, North Boyer Road, and Highway 2 (US-2). Figures in the report also include images of North Boyer Avenue and Mountain View Road.
- **Traffic Counts:** Data was collected during typical weekday AM & PM peak hours, a winter weekday PM peak hour, and weekend AM & PM peak hours. Since the weekend and winter peaks proved to have less traffic, they were not analyzed. The PM peak was observed to have the greatest traffic volumes and so was the only peak period to include all intersections in the analyses. The AM peak hour was analyzed at select intersections to study the impact of project trips near area schools. All counts were summarized in figures. Raw counts were not provided in the TIS.
 - While the TIS does meet the requirements of the UATP as presently written, Fehr & Peers recommends that the UATP be updated in the future to require that all intersections be included in both AM and PM peak hour analyses. Since traffic patterns differ between AM and PM peak hours, some intersections that do not fail in the PM peak hour, may still fail in the AM peak hour, even if the AM peak hour typically experiences lower volumes.
- **Accident Histories:** The TIS includes a summary of crashes from a 2014 to 2018, the most recent 5-year period available. The report also outlines crash hotspots and the number of severe, bike/ped related, and drug/alcohol related crashes. All crashes that occurred within 250 feet of a project intersection are shown in a figure.
 - Table 2. Crash Severity in the TIS appears to have an error as "A Injury Accident" is listed three times under injury type and may require clarification at the City of Sandpoint's discretion.
 - The TIS does not include a comparison of the crashes in the study area to the state average crash rates as required in the UATP.
- **Programmed Improvements:** The TIS outlines plans in the 2007 Sandpoint Urban Area Transportation Plan to convert Mountain View Road to a Minor Arterial road by 2026 with a three-lane cross-section and additional bike/ped improvements.
 - These improvements are not specifically mentioned as being accounted for in the 2030 background or plus project analyses; since they are planned for 2026 completion, they should be included.
 - If the improvements are accounted for in the 2030 analyses, The City of Sandpoint may require clarification. If the improvements are not accounted for in the 2030 analysis, the City of Sandpoint may require DE&A to redo the 2030 analysis with the proposed widening of Mountain View Road. However, including the widening would likely only improve the

LOS results at the affected intersections (#2, #11, and #12) and would not change the results of the study.

- **Baseline (Without-Project) Forecasts:** Forecasted traffic volumes in the TIS were developed using a rate of 3.4% annual growth, as specified by City of Sandpoint staff. The TIS also accounted for the concurrently planned Milltown Medical Office and Samuelson Place developments in the baseline forecast projections. All future projected volumes are illustrated in figures in the study.
 - It should be noted that the TIS does not specify whether the 3.4% growth is based on a local travel demand model or based on historical growth.
- **Future Project Volumes:** Project trip generation, distribution, and assignment are summarized in the TIS and match the corresponding calculations presented in the previously submitted Trip Generation and Distribution Letter (TGDL). Future with-project traffic volumes were developed by combining project trip assignments with baseline traffic volumes. Figures are included in the TIS that outline proposed project trip distribution and assignment. Figures that show the combined future background plus project volumes are also included for 2025 and 2030 horizon years.
- **Traffic Operations:** Traffic operations were reported in the TIS using intersection level of service (LOS) methodologies in the Highway Capacity Manual, 6th Edition (HCM 6).
 - The LOS analysis is included for the existing, future background, and future project conditions at site driveways and at study intersections.
 - Tables 3, 4, and 5 include the results of existing, 2025, and 2030 background conditions analyses, respectively.
 - Tables 13 and 14 include the results of the 2025 and 2030 plus project conditions analyses, respectively.
 - Synchro 10 and Sidra 8 software were used for LOS calculations and are consistent with HCM 6 methodologies. Synchro and Sidra LOS worksheets that summarize assumptions used at each intersection are provided in the appendix to the TIS.
 - North Boyer Ave & Baldy Mountain Road is shown to experience unacceptable LOS in the 2025 and 2030 background PM peaks. The same intersection is shown to experience unacceptable LOS and V/C in the same plus project horizon years.
 - US-2 (Fifth Avenue) & Larch Street was also shown to experience failing V/C in 2030 background and background plus project conditions analyses
- **Capacity Improvements:** The TIS includes a recommendation to modify the intersection control at North Boyer Ave & Baldy Mountain Road to either a roundabout or a traffic signal due to the excessive delay observed in the 2025 and 2030 analyses. The analysis in the study assumed that the intersection would be signalized, so a signalized control mitigation was modeled in the plus project condition analysis. The study showed that signalizing the intersection would improve the LOS and V/C at the intersection to acceptable levels in the 2025 and 2030 analyses.

- The synchro reports in the appendix indicate that North Boyer Avenue should accommodate southbound left turn storage lanes at the two project driveways on that road. Fehr & Peers agrees that the left turn storage lanes will reduce the number of conflicts and increase the safety of the roadway. Those modifications to North Boyer Avenue should be included as part of the recommendations in the body of the report.
 - The estimated projects responsibility towards improvements was also included and indicated that the proposed project should be responsible for 16.65% of the intersection mitigation.
 - It should be noted that signal warrants were not included as part of the TIS but are also not specifically required in the UATP. The report recommends monitoring the intersection and performing a signal warrant analysis to better approximate when the intersection should be signalized. Fehr & Peers recommends a peak hour signal warrant (following MUTCD guidelines) be conducted for the future year analyses to verify if warrants would be met based on the forecasted volumes. If they do not meet or not close to meeting, an alternative mitigation may need to be evaluated and recommended.
- **Queuing Analysis:** As stated in the UATP, "95th-percentile queues should be summarized for existing and proposed intersection turn lanes based upon the future project and improved/mitigated conditions." The TIS does not include any queuing analysis in the body of the study or in the appendix. Fehr & Peers recommends that the City of Sandpoint request an addendum to the TIS to check that the queuing at the study intersection does not exceed available storage capacity.
 - Fehr & Peers recognizes that train crossings can create long queues during peak hours. The U.S. DOT Crossing Inventory estimates that trains cross North Boyer Avenue 30 times per day (see attached Appendix). Fehr & Peers recommends including the train crossing as a study location to determine if excessive queueing occurs.
 - Furthermore, due to the complex nature of train crossings, Synchro may not be an adequate tool to evaluate the queueing at that location. Fehr & Peers recommends using a microsimulation tool to replicate a blocked train crossing during the peak hour analyses. Data collection efforts should be conducted to determine the average length of time the train crossing is closed to accurately incorporate the closure into the microsimulation.
- **Additional Analysis:** As outlined in the Traffic Counts section, data was collected during a winter weekday PM peak hour and during weekend AM & PM peak hours in addition to typical weekday AM & PM peak hours. However, the weekend and winter peaks proved to have substantially less traffic than the weekday peak hours, so no operational analyses were performed for the additional peak hours.
- **Summary, and Conclusion:** The TIS contains a Findings, Summary, and Conclusion section at the end of the report that highlights the conclusions and recommendations of the study. This section

describes the project, summarizes trip generation and study results, and provides an outline of proposed improvements and requirements/conditions of the project. While not necessarily required, it may be worthwhile to include the North Boyer Avenue & Baldy Mountain Road mitigation in the Executive Summary to match the Findings, Summary, and Conclusion section.

CONCLUSION

Fehr & Peers reviewed the TIS performed by DE&A for the proposed North Boyer Development site in Sandpoint, Idaho. Fehr & Peers found that the analysis was performed in keeping with industry standard practice and that the TIS meets the guidelines in the UATP.

It should be noted that the City of Sandpoint may require the following updates to the TIS:

- (1) Table 2. Crash Severity in the TIS appears to have an error and could be clarified. Furthermore, the TIS does not include a comparison of the crashes in the study area to the state average crash rates as required in the UATP. The crash history should be updated to include this comparison.
- (2) The programmed improvements along Mountain View Road were not found to be included in the 2030 analysis. However, including the widening would likely only improve the LOS results at the affected intersections and would not change the results of the study.
- (3) The left turn storage lane modifications to North Boyer Avenue should be included as part of the recommendations in the body of the report.
- (4) Queueing analysis was not included in the TIS. An addendum to the TIS that includes the results of a queueing analysis should be requested.
 - a. Furthermore, the train crossing should be analyzed as part of the queueing analysis.
- (5) A peak hour signal warrant analysis should be performed for North Boyer Ave & Baldy Mountain Road to verify this is a possible mitigation for the future.

APPENDIX
NORTH BOYER AVENUE TRAIN CROSSING INVENTORY REPORT

U. S. DOT CROSSING INVENTORY FORM

DEPARTMENT OF TRANSPORTATION

FEDERAL RAILROAD ADMINISTRATION

OMB No. 2130-0017

Instructions for the initial reporting of the following types of new or previously unreported crossings: For public highway-rail grade crossings, complete the entire inventory Form. For private highway-rail grade crossings, complete the Header, Parts I and II, and the Submission Information section. For public pathway grade crossings (including pedestrian station grade crossings), complete the Header, Parts I and II, and the Submission Information section. For Private pathway grade crossings, complete the Header, Parts I and II, and the Submission Information section. For grade-separated highway-rail or pathway crossings (including pedestrian station crossings), complete the Header, Part I, and the Submission Information section. For changes to existing data, complete the Header, Part I Items 1-3, and the Submission Information section, in addition to the updated data fields. Note: For private crossings only, Part I Item 20 and Part III Item 2.K. are required unless otherwise noted.

An asterisk * denotes an optional field.

A. Revision Date (MM/DD/YYYY) <u>04 /14 /2020</u>	B. Reporting Agency <input checked="" type="checkbox"/> Railroad <input type="checkbox"/> Transit <input type="checkbox"/> State <input type="checkbox"/> Other	C. Reason for Update (Select only one) <input checked="" type="checkbox"/> Change in Data <input type="checkbox"/> New Crossing <input type="checkbox"/> Closed <input type="checkbox"/> Re-Open <input type="checkbox"/> Date <input type="checkbox"/> Change in Primary <input type="checkbox"/> Change Only <input type="checkbox"/> Operating RR	<input type="checkbox"/> No Train Traffic <input type="checkbox"/> Quiet Zone Update <input type="checkbox"/> Admin. Correction	D. DOT Crossing Inventory Number <u>058723C</u>
--	--	--	--	---

Part I: Location and Classification Information

1. Primary Operating Railroad <u>BNSF Railway Company [BNSF]</u>	2. State <u>IDAHO</u>	3. County <u>BONNER</u>			
4. City / Municipality <input type="checkbox"/> In <input checked="" type="checkbox"/> Near <u>SANDPOINT</u>	5. Street/Road Name & Block Number <u>N BOYER</u> <small>(Street/Road Name) * (Block Number)</small>	6. Highway Type & No. <u>Not Yet Reported by State</u>			
7. Do Other Railroads Operate a Separate Track at Crossing? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>If Yes, Specify RR</small>		8. Do Other Railroads Operate Over Your Track at Crossing? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <small>If Yes, Specify RR</small>			
9. Railroad Division or Region <input type="checkbox"/> None <u>MONTANA</u>	10. Railroad Subdivision or District <input type="checkbox"/> None <u>KOOTENAI RIVER</u>	11. Branch or Line Name <input type="checkbox"/> None <u>WHTFISH-SANDP J</u>	12. RR Milepost <u>1398.503</u> <small>(prefix) (nnnn.nnn) (suffix)</small>		
13. Line Segment <small>*</small> <u>36</u>	14. Nearest RR Timetable Station <small>*</small> <u>COLBURN</u>	15. Parent RR (if applicable) <input checked="" type="checkbox"/> N/A	16. Crossing Owner (if applicable) <input type="checkbox"/> N/A <u>BNSF</u>		
17. Crossing Type <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private	18. Crossing Purpose <input checked="" type="checkbox"/> Highway <input type="checkbox"/> Pathway, Ped. <input type="checkbox"/> Station, Ped.	19. Crossing Position <input checked="" type="checkbox"/> At Grade <input type="checkbox"/> RR Under <input type="checkbox"/> RR Over	20. Public Access (if Private Crossing) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Type of Train <input checked="" type="checkbox"/> Freight <input checked="" type="checkbox"/> Intercity Passenger <input type="checkbox"/> Commuter <input type="checkbox"/> Transit <input type="checkbox"/> Shared Use Transit <input type="checkbox"/> Tourist/Other	22. Average Passenger Train Count Per Day <input type="checkbox"/> Less Than One Per Day <input checked="" type="checkbox"/> Number Per Day <u>2</u>
23. Type of Land Use <input checked="" type="checkbox"/> Open Space <input type="checkbox"/> Farm <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Institutional <input type="checkbox"/> Recreational <input type="checkbox"/> RR Yard			24. Is there an Adjacent Crossing with a Separate Number? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Provide Crossing Number <u></u>		
25. Quiet Zone (FRA provided) <input type="checkbox"/> No <input type="checkbox"/> 24 Hr <input type="checkbox"/> Partial <input type="checkbox"/> Chicago Excused			<small>Date Established _____</small>		
26. HSR Corridor ID <input type="checkbox"/> N/A	27. Latitude in decimal degrees <small>(WGS84 std: nn.nnnnnnn)</small> <u>48.3374458</u>		28. Longitude in decimal degrees <small>(WGS84 std: -nnn.nnnnnnn)</small> <u>-116.558461</u>		29. Lat/Long Source <input checked="" type="checkbox"/> Actual <input type="checkbox"/> Estimated
30.A. Railroad Use * <u></u>			31.A. State Use * <u></u>		
30.B. Railroad Use * <u></u>			31.B. State Use * <u></u>		
30.C. Railroad Use * <u></u>			31.C. State Use * <u></u>		
30.D. Railroad Use * <u></u>			31.D. State Use * <u></u>		
32.A. Narrative (Railroad Use) * <small>(I.27 I.28 I.29) Value Provided by Railroad, Not Yet</small>			32.B. Narrative (State Use) * <u></u>		
33. Emergency Notification Telephone No. (posted) <u>800-832-5452</u>		34. Railroad Contact (Telephone No.) <u>817-352-1549</u>		35. State Contact (Telephone No.) <u>208-334-8492</u>	

Part II: Railroad Information

1. Estimated Number of Daily Train Movements				
1.A. Total Day Thru Trains (6 AM to 6 PM) <u>15</u>	1.B. Total Night Thru Trains (6 PM to 6 AM) <u>15</u>	1.C. Total Switching Trains <u>0</u>	1.D. Total Transit Trains <u>0</u>	1.E. Check if Less Than One Movement Per Day <input type="checkbox"/> How many trains per week?
2. Year of Train Count Data (YYYY) <u>2019</u>		3. Speed of Train at Crossing <small>3.A. Maximum Timetable Speed (mph)</small> <u>79</u> <small>3.B. Typical Speed Range Over Crossing (mph)</small> From <u>1</u> to <u>79</u>		
4. Type and Count of Tracks <small>Main</small> <u>1</u> <small>Siding</small> <u>0</u> <small>Yard</small> <u>0</u> <small>Transit</small> <u>0</u> <small>Industry</small> <u>0</u>				
5. Train Detection (Main Track only) <input type="checkbox"/> Constant Warning Time <input type="checkbox"/> Motion Detection <input type="checkbox"/> AFO <input type="checkbox"/> PTC <input type="checkbox"/> DC <input type="checkbox"/> Other <input checked="" type="checkbox"/> None				
6. Is Track Signaled? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		7.A. Event Recorder <input type="checkbox"/> Yes <input type="checkbox"/> No		7.B. Remote Health Monitoring <input type="checkbox"/> Yes <input type="checkbox"/> No

U. S. DOT CROSSING INVENTORY FORM

A. Revision Date (MM/DD/YYYY)
04/14/2020

PAGE 2

D. Crossing Inventory Number (7 char.)
058723C

Part III: Highway or Pathway Traffic Control Device Information

1. Are there Signs or Signals?		2. Types of Passive Traffic Control Devices associated with the Crossing					
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 2.A. Crossbuck Assemblies (count) 2		2.B. STOP Signs (R1-1) (count) 2		2.C. YIELD Signs (R1-2) (count) _____		2.D. Advance Warning Signs (Check all that apply; include count) <input checked="" type="checkbox"/> W10-1 2 <input type="checkbox"/> W10-3 _____ <input type="checkbox"/> W10-11 _____ <input type="checkbox"/> W10-2 _____ <input checked="" type="checkbox"/> W10-4 _____ <input type="checkbox"/> W10-12 _____	
2.E. Low Ground Clearance Sign (W10-5) <input checked="" type="checkbox"/> Yes (count _____) <input type="checkbox"/> No		2.F. Pavement Markings <input type="checkbox"/> Stop Lines <input type="checkbox"/> Dynamic Envelope <input type="checkbox"/> RR Xing Symbols <input checked="" type="checkbox"/> None		2.G. Channelization Devices/Medians <input type="checkbox"/> All Approaches <input type="checkbox"/> Median <input type="checkbox"/> One Approach <input checked="" type="checkbox"/> None		2.H. EXEMPT Sign (R15-3) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
2.J. Other MUTCD Signs Specify Type _____ Count 1 Specify Type _____ Count 2 Specify Type _____ Count _____		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2.K. Private Crossing Signs (if private) <input type="checkbox"/> Yes <input type="checkbox"/> No		2.L. LED Enhanced Signs (List types) _____	
3. Types of Train Activated Warning Devices at the Grade Crossing (specify count of each device for all that apply)							
3.A. Gate Arms (count) Roadway 0 Pedestrian _____	3.B. Gate Configuration <input type="checkbox"/> 2 Quad <input type="checkbox"/> Full (Barrier) <input type="checkbox"/> 3 Quad Resistance <input type="checkbox"/> 4 Quad <input type="checkbox"/> Median Gates	3.C. Cantilevered (or Bridged) Flashing Light Structures (count) Over Traffic Lane 0 <input type="checkbox"/> Incandescent Not Over Traffic Lane 0 <input type="checkbox"/> LED	3.D. Mast Mounted Flashing Lights (count of masts) 0 <input type="checkbox"/> Incandescent <input type="checkbox"/> LED <input type="checkbox"/> Back Lights Included <input type="checkbox"/> Side Lights Included	3.E. Total Count of Flashing Light Pairs 0			
3.F. Installation Date of Current Active Warning Devices: (MM/YYYY) _____ / _____ <input checked="" type="checkbox"/> Not Required		3.G. Wayside Horn <input type="checkbox"/> Yes Installed on (MM/YYYY) _____ / _____ <input type="checkbox"/> No		3.H. Highway Traffic Signals Controlling Crossing <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		3.I. Bells (count) 0	
3.J. Non-Train Active Warning <input type="checkbox"/> Flagging/Flagman <input type="checkbox"/> Manually Operated Signals <input type="checkbox"/> Watchman <input type="checkbox"/> Floodlighting <input type="checkbox"/> None				3.K. Other Flashing Lights or Warning Devices Count 0 Specify type _____			
4.A. Does nearby Hwy Intersection have Traffic Signals? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4.B. Hwy Traffic Signal Interconnection <input checked="" type="checkbox"/> Not Interconnected <input type="checkbox"/> For Traffic Signals <input type="checkbox"/> For Warning Signs	4.C. Hwy Traffic Signal Preemption <input type="checkbox"/> Simultaneous <input type="checkbox"/> Advance	5. Highway Traffic Pre-Signals <input type="checkbox"/> Yes <input type="checkbox"/> No Storage Distance * _____ Stop Line Distance * _____	6. Highway Monitoring Devices (Check all that apply) <input type="checkbox"/> Yes - Photo/Video Recording <input type="checkbox"/> Yes - Vehicle Presence Detection <input type="checkbox"/> None			

Part IV: Physical Characteristics

1. Traffic Lanes Crossing Railroad Number of Lanes 2	<input type="checkbox"/> One-way Traffic <input checked="" type="checkbox"/> Two-way Traffic <input type="checkbox"/> Divided Traffic	2. Is Roadway/Pathway Paved? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3. Does Track Run Down a Street? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Is Crossing Illuminated? (Street lights within approx. 50 feet from nearest rail) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
5. Crossing Surface (on Main Track, multiple types allowed) <input type="checkbox"/> 1 Timber <input type="checkbox"/> 2 Asphalt <input type="checkbox"/> 3 Asphalt and Timber <input checked="" type="checkbox"/> 4 Concrete <input type="checkbox"/> 5 Concrete and Rubber <input type="checkbox"/> 6 Rubber <input type="checkbox"/> 7 Metal <input type="checkbox"/> 8 Unconsolidated <input type="checkbox"/> 9 Composite <input type="checkbox"/> 10 Other (specify) _____		Installation Date * (MM/YYYY) _____ / _____		Width * _____		Length * _____	
6. Intersecting Roadway within 500 feet? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Approximate Distance (feet) _____		7. Smallest Crossing Angle <input type="checkbox"/> 0° - 29° <input type="checkbox"/> 30° - 59° <input checked="" type="checkbox"/> 60° - 90°		8. Is Commercial Power Available? * <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			

Part V: Public Highway Information

1. Highway System <input type="checkbox"/> (01) Interstate Highway System <input type="checkbox"/> (02) Other Nat Hwy System (NHS) <input type="checkbox"/> (03) Federal AID, Not NHS <input checked="" type="checkbox"/> (08) Non-Federal Aid	2. Functional Classification of Road at Crossing <input checked="" type="checkbox"/> (0) Rural <input type="checkbox"/> (1) Urban <input type="checkbox"/> (1) Interstate <input type="checkbox"/> (5) Major Collector <input type="checkbox"/> (2) Other Freeways and Expressways <input type="checkbox"/> (6) Minor Collector <input type="checkbox"/> (3) Other Principal Arterial <input type="checkbox"/> (7) Local <input type="checkbox"/> (4) Minor Arterial	3. Is Crossing on State Highway System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Highway Speed Limit MPH <input type="checkbox"/> Posted <input checked="" type="checkbox"/> Statutory
5. Linear Referencing System (LRS Route ID) * _____		6. LRS Milepost * _____	
7. Annual Average Daily Traffic (AADT) Year 1989 AADT 000070	8. Estimated Percent Trucks 14 %	9. Regularly Used by School Buses? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Average Number per Day 0	10. Emergency Services Route <input type="checkbox"/> Yes <input type="checkbox"/> No

Submission Information - This information is used for administrative purposes and is not available on the public website.

Submitted by _____ Organization _____ Phone _____ Date _____

Public reporting burden for this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. According to the Paperwork Reduction Act of 1995, a federal agency may not conduct or sponsor, and a person is not required to, nor shall a person be subject to a penalty for failure to comply with, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for information collection is 2130-0017. Send comments regarding this burden estimate or any other aspect of this collection, including for reducing this burden to: Information Collection Officer, Federal Railroad Administration, 1200 New Jersey Ave. SE, MS-25 Washington, DC 20590.

MEMORANDUM

Date: August 27, 2020
To: Amanda Wilson, City of Sandpoint
From: Christopher Bender, Fehr & Peers
Preston Stinger, Fehr & Peers
Subject: **North Boyer Development TIS Review - Recommendations**

UT20-2221

INTRODUCTION

This technical memorandum summarizes Fehr & Peers' review of David Evans and Associates, Inc. (DE&A) Synchro analysis performed for the Traffic Impact Study (TIS) for the proposed North Boyer Development in Sandpoint, Idaho. The review also includes Fehr & Peers' independent analysis of the following four intersections:

- N Boyer Ave & Baldy Mountain Rd
- Hwy 2 & Larch St
- N Division Ave & Baldy Mountain Rd
- S Boyer Ave & Hwy 2

This memo includes recommendations regarding the DE&A's proposed mitigations, including fair share contribution, as well as a summary of any discrepancies between the two analyses. It should be noted that the recommendations are based on the data presented in the documents delivered to Fehr & Peers. Fehr & Peers did not collect any new data for this review.

SYNCHRO ANALYSIS SUMMARY:

Table 1 reports LOS at the study intersections. For signalized intersections, average vehicular delay and LOS are reported. For unsignalized intersections, the worst movement delay and LOS are reported. All columns reflect conditions with current lane configurations and intersection controls and no mitigations.

Table 1: PM Peak Hour Level of Service Comparison

Intersection			Existing Background	2025 Background	2025 Plus Project	2030 Background	2030 Plus Project
ID ²	Location	Analyst	LOS & Sec/Veh ¹				
3	N Boyer Ave & Baldy Mountain Rd	F&P	C / 23	E / 39	F / 96	F / 77	F / 208
		DE&A	C / 24	E / 41	F / 102	F / 83	F / 212
6	Hwy 2 & Larch St	F&P	E / 60	E / 61	E / 61	E / 63	E / 63
		DE&A	C / 27	D / 35	D / 36	D / 51	D / 53
7	N Division Ave & Baldy Mountain Rd	F&P	C / 17	C / 22	C / 24	D / 29	D / 32
		DE&A	C / 17	C / 17	C / 18	C / 22	C / 24
9	S Boyer Ave & Hwy 2	F&P	B / 19	C / 24	C / 25	C / 31	C / 32
		DE&A	B / 19	C / 22	C / 22	C / 28	C / 29

1. Intersection average LOS and delay for signalized intersections, worst movement LOS and delay for unsignalized intersections.

2. Fehr & Peers' analysis assigned the same ID to each intersection as in the DE&A TIS for consistency and for ease of comparison.
Source: Fehr & Peers.

Several notable differences were observed between the DE&A analysis, and the analysis performed by Fehr & Peers.

- DE&A appears to apply a general peak hour factor (PHF) of 0.95 in all future scenarios (except for 2025 at intersection 3, which appeared to be missed). Applying an increased PHF across all study intersections is standard practice when future volumes show intersections nearing or exceeding existing capacity and the peak hour volume "spikes" are likely to flatten out. However, F&P recognizes that most intersections in the study area are unlikely to exceed capacity in future conditions (except at intersection 3), so the PHF observed during data collection efforts may be more accurate.
 - This is likely the cause of the difference between the two analyses at N Division Ave & Baldy Mountain Rd.
- Conflicting pedestrians were double counted in the DE&A Synchro analysis. This would only slightly affect the results as the pedestrian volumes at the study locations are already low.
- The future year volumes in the DE&A analysis appear to be calculated using exponential growth rates. Fehr & Peers typically recommends using linear growth rates, though the difference over 11 years is minor.
- Signal timings for Hwy 2 & Larch shown in DE&A Synchro reports do not appear to match the timings shown in the city signal timing plans received in August 2020, specifically, the coordinated cycle length and split times. The different signal timings (combined with the other differences noted above) are likely the cause of the significant difference in delay shown between the analyses.

QUEUEING ANALYSIS SUMMARY:

Table 2 reports queues at the study intersections as observed in Fehr & Peers' analysis. All columns reflect conditions with current lane configurations and intersection controls and no mitigations. The **bolded** numbers in the table indicate that the queue exceeds existing storage capacity.

As shown in the table, the intersections at Hwy 2 & Larch St and at South Boyer Ave & Hwy 2 have queue lengths that exceed storage capacity. The intersection at Hwy 2 & Larch St likely experiences long queues due to high vehicle demand in the north and southbound directions and inefficient signal timing (this is discussed further in the *Mitigation Measures* section of this memo). The intersection at South Boyer Ave & Hwy 2 exceeds capacity due to high vehicle demand in the east and westbound directions as well as the intersection's proximity to other nearby intersections. Since the intersection is so close to other intersections, the storage capacity at South Boyer Ave & Hwy 2 is limited.

Table 2: PM Peak Hour Queuing Comparison

Intersection		Existing Background											
ID ²	Location	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
3	N Boyer Ave & Baldy Mountain Rd	55	15	-	-	0	-	8	-	-	-	0	-
6	Hwy 2 & Larch St	261	72	-	-	106	11	156	256	-	46	318	-
7	N Division Ave & Baldy Mountain Rd	-	-	-	10	-	-	23	-	20	-	-	-
9	S Boyer Ave & Hwy 2	102	213	-	58	242	-	54	89	-	57	115	-
Intersection		2025 Background											
ID ²	Location	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
3	N Boyer Ave & Baldy Mountain Rd	108	20	-	-	0	-	8	-	-	-	0	-
6	Hwy 2 & Larch St	301	77	-	-	119	31	211	311	-	55	424	-
7	N Division Ave & Baldy Mountain Rd	-	-	-	15	-	-	38	-	28	-	-	-
9	S Boyer Ave & Hwy 2	119	299	-	66	312	-	65	105	-	67	144	-
Intersection		2025 Plus Project											
ID ²	Location	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
3	N Boyer Ave & Baldy Mountain Rd	205	23	-	-	0	-	8	-	-	-	0	-
6	Hwy 2 & Larch St	306	80	-	-	119	31	268	312	-	55	431	-
7	N Division Ave & Baldy Mountain Rd	-	-	-	15	-	-	40	-	33	-	-	-
9	S Boyer Ave & Hwy 2	145	299	-	66	312	-	67	105	-	68	150	-
Intersection		2030 Background											
ID ²	Location	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
3	N Boyer Ave & Baldy Mountain Rd	188	25	-	-	0	-	10	-	-	-	0	-
6	Hwy 2 & Larch St	335	80	-	-	134	48	243	370	-	61	571	-
7	N Division Ave & Baldy Mountain Rd	-	-	-	18	-	-	58	-	35	-	-	-
9	S Boyer Ave & Hwy 2	150	358	-	73	370	-	92	119	-	76	168	-
Intersection		2030 Plus Project											
ID ²	Location	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
3	N Boyer Ave & Baldy Mountain Rd	325	28	-	-	0	-	10	-	-	-	0	-
6	Hwy 2 & Larch St	343	83	-	-	134	48	298	370	-	61	577	-
7	N Division Ave & Baldy Mountain Rd	-	-	-	18	-	-	63	-	40	-	-	-
9	S Boyer Ave & Hwy 2	170	358	-	73	370	-	97	119	-	76	175	-

1. 95th percentile queue in feet is shown for each movement. Bolded numbers indicate which queues exceed storage capacity.
 2. Fehr & Peers' analysis assigned the same ID to each intersection as in the DE&A TIS for consistency and for ease of comparison.
- Source: Fehr & Peers.

MITIGATION MEASURES:

The TIS includes a recommendation to signalize the intersection of N Boyer Ave & Baldy Mountain Rd as the intersection begins to meet signal warrants. DE&A included a peak hour signal warrant analysis that concluded that the volumes at the intersection are likely to warrant signalization by the 2030 Background horizon year. Fehr & Peers agrees that this is an appropriate mitigation for this intersection. Due to the high vehicle volume served on N Boyer Ave, other mitigations like configuring the intersection to be all-way stop controlled or a roundabout would likely result in southbound queues backing up into the train crossing. A traffic signal, however, could be constructed in a way to prevent queueing from backing into the train crossing. One option would be to place the southbound signal mast arm north of the train crossing. In this case, the train crossing would need to be incorporated into the N Boyer Ave & Baldy Mountain Rd signal design and the signal would need to include preemptive detection to turn the signal to an all red phase when the train is crossing.

Since the DE&A analysis presented in the TIS shows Hwy 2 & Larch St remaining LOS D or better in all scenarios, it does not include recommendations to mitigate the added delay. However, the analysis performed by Fehr & Peers shows that the intersection currently operates at LOS E and continues to operate at unacceptable levels in future conditions unless mitigations are implemented. Currently, the intersection includes a shared left-through movement lane in the westbound direction, which requires split phasing at the signal, which can be inefficient. Modifying the layout using the existing right of way and optimizing the signal phasing and timing would decrease the average delay and queue lengths at the intersection but was not shown to reduce the delay to acceptable levels. The UATP recommends adding a westbound left turn bay and an eastbound right turn bay at Hwy 2 & Larch St. Implementing this recommendation, combined with signal optimization would reduce the delay and queue lengths to acceptable levels in all scenarios. Further optimizing the cycle lengths and offsets of the surrounding network may also reduce the overall delay within the network, but further signal coordination efforts would be required to evaluate this mitigation.

The intersection at South Boyer Ave & Hwy 2, due to its complex geometry and proximity to other nearby intersections should be studied further to determine if the queueing at that intersection creates further operational delay in the surrounding area. If the nearby intersections experience low traffic volumes, mitigation at the South Boyer Ave & Hwy 2 may not be necessary because the surrounding intersections would still operate at acceptable LOS. If the queueing does significantly impact the experienced delay at the surrounding intersections, then mitigations should be planned to reduce the queues at the intersection. Further study that includes the operations of the nearby intersections would likely indicate how best to mitigate the area, if any mitigations are necessary.

All Synchro reports developed by Fehr & Peers, including mitigated versions of Hwy 2 & Larch St, are included in the appendix.

FAIR SHARE CONTRIBUTION:

As outlined in the TIS, the North Boyer Development is one of multiple developments in Sandpoint that are likely to contribute to the excessive delays at the intersections of N Boyer Ave & Baldy Mountain Rd and Hwy 2 & Larch St. The TIS included a fair share contribution analysis but did not use the method outlined in the UATP. As described on Page 4 in the TIS Requirement portion of the UATP, "The project's proportionate share of an improvement is typically determined by dividing project trip assignments along a roadway section or at an intersection by total projected volumes." Fehr & Peers used this method to calculate the project's fair share contribution below:

- N Boyer Ave & Baldy Mountain Rd
 - 2030 Background Plus Project AM Volume = 1140
 - Project AM Volume = 249
 - Fair Share AM = 21.84%
 - 2030 Background Plus Project PM Volume = 1305 vehicles
 - Project Volume Through Intersection = 175 vehicles
 - Fair Share = 13.41%
 - **Worst Impact Fair Share = 21.84%**
- Hwy 2 & Larch St
 - 2025 Background Volume = 2,353 vehicles
 - Project Trips Through Intersection = 59 vehicles
 - Total Volume Through Intersection = 2,412
 - Fair Share = 2.45%

The DE&A TIS proposed that the development be responsible for 17.35% of mitigation costs at N Boyer Ave & Baldy Mountain Rd, and no mitigation costs at Hwy 2 & Larch St (Hwy 2 & Larch St was not recommended to be mitigated in the TIS). However, based on these calculations using the method outlined in the UATP, Fehr & Peers recommends that the proposed development would be responsible for 21.84% of mitigation costs at N Boyer Ave & Baldy Mountain Rd, and 2.45% of mitigation costs at Hwy 2 & Larch St.

APPENDIX A
SYNCHRO REPORT SHEETS
ALL STUDY INTERSECTIONS - NO MITIGATIONS

Intersection

Int Delay, s/veh 6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗	↖ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗ ↗
Traffic Vol, veh/h	145	1	114	1	0	3	86	174	2	4	173	133
Future Vol, veh/h	145	1	114	1	0	3	86	174	2	4	173	133
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	0	-	70	-	-	-	160	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	159	1	125	1	0	3	95	191	2	4	190	146

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	655	659	263	721	731	197	336	0	0	198	0	0
Stage 1	271	271	-	387	387	-	-	-	-	-	-	-
Stage 2	384	388	-	334	344	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	379	384	776	343	349	844	1223	-	-	1375	-	-
Stage 1	735	685	-	637	610	-	-	-	-	-	-	-
Stage 2	639	609	-	680	637	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	354	351	776	268	319	840	1223	-	-	1368	-	-
Mov Cap-2 Maneuver	354	351	-	268	319	-	-	-	-	-	-	-
Stage 1	678	682	-	585	559	-	-	-	-	-	-	-
Stage 2	587	558	-	567	634	-	-	-	-	-	-	-

Approach	EB	WB			NB			SB			
HCM Control Delay, s	17.6		11.6			2.7			0.1		
HCM LOS	C		B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR		
Capacity (veh/h)	1223	-	-	354	768	548	1368	-	-		
HCM Lane V/C Ratio	0.077	-	-	0.45	0.165	0.008	0.003	-	-		
HCM Control Delay (s)	8.2	-	-	23.2	10.6	11.6	7.6	0	-		
HCM Lane LOS	A	-	-	C	B	B	A	A	-		
HCM 95th %tile Q(veh)	0.3	-	-	2.2	0.6	0	0	-	-		

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
Existing PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑			↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (veh/h)	231	24	118	12	59	109	98	533	4	26	539	221
Future Volume (veh/h)	231	24	118	12	59	109	98	533	4	26	539	221
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00		0.91	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	248	26	13	13	63	1	105	573	3	28	580	206
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	303	198	99	17	82	77	599	690	4	717	660	234
Arrive On Green	0.17	0.17	0.17	0.05	0.05	0.05	0.33	0.19	0.19	0.40	0.26	0.26
Sat Flow, veh/h	1795	1175	587	320	1549	1449	1795	3653	19	1795	2585	916
Grp Volume(v), veh/h	248	0	39	76	0	1	105	281	295	28	401	385
Grp Sat Flow(s), veh/h/ln	1795	0	1762	1869	0	1449	1795	1791	1881	1795	1791	1710
Q Serve(g_s), s	16.0	0.0	2.3	4.8	0.0	0.1	5.0	18.1	18.1	1.1	25.8	25.9
Cycle Q Clear(g_c), s	16.0	0.0	2.3	4.8	0.0	0.1	5.0	18.1	18.1	1.1	25.8	25.9
Prop In Lane	1.00			0.33	0.17		1.00	1.00		0.01	1.00	0.54
Lane Grp Cap(c), veh/h	303	0	297	99	0	77	599	338	355	717	458	437
V/C Ratio(X)	0.82	0.00	0.13	0.76	0.00	0.01	0.18	0.83	0.83	0.04	0.88	0.88
Avail Cap(c_a), veh/h	507	0	498	221	0	171	599	497	522	717	588	561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.1	0.0	42.4	56.1	0.0	53.8	28.3	46.8	46.8	22.0	42.9	42.9
Incr Delay (d2), s/veh	2.1	0.0	0.1	4.5	0.0	0.0	0.1	20.6	19.8	0.0	20.5	21.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	7.3	0.0	1.0	2.4	0.0	0.0	2.2	10.0	10.4	0.5	14.0	13.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	50.2	0.0	42.5	60.6	0.0	53.8	28.4	67.4	66.6	22.0	63.4	64.6
LnGrp LOS	D	A	D	E	A	D	C	E	E	C	E	E
Approach Vol, veh/h						77			681			814
Approach Delay, s/veh						60.5			61.0			62.5
Approach LOS			D			E			E			E
Timer - Assigned Phs	1	2		4	5	6			8			
Phs Duration (G+Y+Rc), s	53.1	28.4		26.3	45.2	36.3			12.2			
Change Period (Y+Rc), s	* 5.2	* 5.7		* 6.1	* 5.2	* 5.6			5.8			
Max Green Setting (Gmax), s	* 16	* 33		* 34	* 9.8	* 39			14.2			
Max Q Clear Time (g_c+l1), s	3.1	20.1		18.0	7.0	27.9			6.8			
Green Ext Time (p_c), s	0.0	1.9		0.2	0.0	2.7			0.1			
Intersection Summary												
HCM 6th Ctrl Delay				59.8								
HCM 6th LOS				E								
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)

Existing PM



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	248	153	76	117	105	577	28	818
v/c Ratio	0.82	0.41	0.53	0.41	0.66	0.34	0.10	0.50
Control Delay	68.7	13.6	65.8	5.5	72.2	24.6	43.6	23.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.7	13.6	65.8	5.5	72.2	24.6	43.6	23.2
Queue Length 50th (ft)	188	17	58	0	79	163	19	212
Queue Length 95th (ft)	261	72	106	11	#156	256	46	318
Internal Link Dist (ft)		589	263			309		573
Turn Bay Length (ft)	120			80	70			70
Base Capacity (vph)	504	544	220	343	167	1712	274	1635
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.28	0.35	0.34	0.63	0.34	0.10	0.50

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↑	↑	↑
Traffic Vol, veh/h	86	130	136	85	76	155
Future Vol, veh/h	86	130	136	85	76	155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	80	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	105	159	166	104	93	189
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	264	0	621	185
Stage 1	-	-	-	-	185	-
Stage 2	-	-	-	-	436	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1306	-	453	860
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	654	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1306	-	392	860
Mov Cap-2 Maneuver	-	-	-	-	392	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	566	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	5	12.6			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	392	860	-	-	1306	-
HCM Lane V/C Ratio	0.236	0.22	-	-	0.127	-
HCM Control Delay (s)	17	10.4	-	-	8.2	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	0.8	-	-	0.4	-

HCM 6th Signalized Intersection Summary
9: S Boyer Ave & Hwy 2

North Boyer Development (Peer Review)
Existing PM

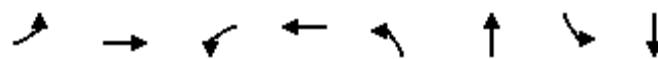
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓		↑	↓		↑	↓	
Traffic Volume (veh/h)	133	345	0	65	345	1	66	122	28	76	118	112
Future Volume (veh/h)	133	345	0	65	345	1	66	122	28	76	118	112
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.97		0.93	0.97		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	145	375	0	71	375	1	72	133	14	83	128	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	308	491	0	302	484	1	311	387	41	343	287	123
Arrive On Green	0.17	0.26	0.00	0.17	0.26	0.26	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1795	1885	0	1795	1879	5	1178	1664	175	1213	1232	530
Grp Volume(v), veh/h	145	375	0	71	0	376	72	0	147	83	0	183
Grp Sat Flow(s), veh/h/ln	1795	1885	0	1795	0	1884	1178	0	1839	1213	0	1762
Q Serve(g_s), s	3.7	9.3	0.0	1.7	0.0	9.4	2.8	0.0	3.4	3.1	0.0	4.5
Cycle Q Clear(g_c), s	3.7	9.3	0.0	1.7	0.0	9.4	7.4	0.0	3.4	6.5	0.0	4.5
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.10	1.00		0.30
Lane Grp Cap(c), veh/h	308	491	0	302	0	485	311	0	428	343	0	410
V/C Ratio(X)	0.47	0.76	0.00	0.23	0.00	0.77	0.23	0.00	0.34	0.24	0.00	0.45
Avail Cap(c_a), veh/h	353	705	0	353	0	667	454	0	651	491	0	624
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.0	17.3	0.0	18.3	0.0	17.5	19.8	0.0	16.3	19.0	0.0	16.7
Incr Delay (d2), s/veh	0.4	1.6	0.0	0.1	0.0	2.5	0.1	0.0	0.2	0.1	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	1.4	3.8	0.0	0.7	0.0	3.9	0.7	0.0	1.3	0.8	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.4	19.0	0.0	18.4	0.0	20.0	20.0	0.0	16.4	19.1	0.0	17.0
LnGrp LOS	B	B	A	B	A	B	B	A	B	B	A	B
Approach Vol, veh/h	520				447			219			266	
Approach Delay, s/veh	19.1				19.7			17.6			17.6	
Approach LOS	B				B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.8	18.6		17.4	14.9	18.5		17.4				
Change Period (Y+Rc), s	6.2	* 5.4		* 5.6	6.2	* 5.4		* 5.6				
Max Green Setting (Gmax), s	10.0	* 19		* 18	10.0	* 18		* 18				
Max Q Clear Time (g_c+l1), s	3.7	11.3		8.5	5.7	11.4		9.4				
Green Ext Time (p_c), s	0.0	0.9		0.6	0.1	0.8		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				18.8								
HCM 6th LOS				B								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Queues

9: S Boyer Ave & Hwy 2

North Boyer Development (Peer Review)

Existing PM



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	145	375	71	376	72	163	83	250
v/c Ratio	0.31	0.40	0.15	0.47	0.34	0.38	0.30	0.57
Control Delay	23.7	17.1	22.1	20.2	23.8	19.7	21.7	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	17.1	22.1	20.2	23.8	19.7	21.7	19.2
Queue Length 50th (ft)	40	102	18	102	20	39	22	49
Queue Length 95th (ft)	102	213	58	#242	54	89	57	115
Internal Link Dist (ft)		740		687		453		798
Turn Bay Length (ft)	100		90				75	
Base Capacity (vph)	499	973	460	868	425	848	561	822
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.39	0.15	0.43	0.17	0.19	0.15	0.30

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection

Int Delay, s/veh 9.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↔	↔		↑	↑		↔	↔	
Traffic Vol, veh/h	173	1	136	1	0	4	103	207	2	5	206	159
Future Vol, veh/h	173	1	136	1	0	4	103	207	2	5	206	159
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	0	-	70	-	-	-	160	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	190	1	149	1	0	4	113	227	2	5	226	175

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	780	784	314	858	870	233	401	0	0	234	0	0
Stage 1	324	324	-	459	459	-	-	-	-	-	-	-
Stage 2	456	460	-	399	411	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	313	325	726	277	290	806	1158	-	-	1333	-	-
Stage 1	688	650	-	582	566	-	-	-	-	-	-	-
Stage 2	584	566	-	627	595	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	287	290	726	201	259	802	1158	-	-	1327	-	-
Mov Cap-2 Maneuver	287	290	-	201	259	-	-	-	-	-	-	-
Stage 1	621	647	-	523	508	-	-	-	-	-	-	-
Stage 2	524	508	-	495	592	-	-	-	-	-	-	-

Approach	EB	WB			NB			SB				
HCM Control Delay, s	26.8	12.3			2.8			0.1				
HCM LOS	D	B										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	1158	-	-	287	718	502	1327	-	-			
HCM Lane V/C Ratio	0.098	-	-	0.662	0.21	0.011	0.004	-	-			
HCM Control Delay (s)	8.4	-	-	39.1	11.3	12.3	7.7	0	-			
HCM Lane LOS	A	-	-	E	B	B	A	A	-			
HCM 95th %tile Q(veh)	0.3	-	-	4.3	0.8	0	0	-	-			

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
2025 PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑			↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (veh/h)	275	29	141	14	70	130	117	635	5	31	642	263
Future Volume (veh/h)	275	29	141	14	70	130	117	635	5	31	642	263
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.92	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	296	31	21	15	75	2	126	683	4	33	690	249
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	341	197	133	19	97	91	474	784	5	616	759	274
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.26	0.21	0.21	0.34	0.29	0.29
Sat Flow, veh/h	1795	1037	703	312	1558	1467	1795	3651	21	1795	2572	928
Grp Volume(v), veh/h	296	0	52	90	0	2	126	335	352	33	480	459
Grp Sat Flow(s), veh/h/ln	1795	0	1740	1870	0	1467	1795	1791	1881	1795	1791	1709
Q Serve(g_s), s	19.2	0.0	3.0	5.7	0.0	0.2	6.7	21.7	21.7	1.5	31.0	31.0
Cycle Q Clear(g_c), s	19.2	0.0	3.0	5.7	0.0	0.2	6.7	21.7	21.7	1.5	31.0	31.0
Prop In Lane	1.00		0.40	0.17		1.00	1.00		0.01	1.00		0.54
Lane Grp Cap(c), veh/h	341	0	330	116	0	91	474	385	404	616	528	504
V/C Ratio(X)	0.87	0.00	0.16	0.78	0.00	0.02	0.27	0.87	0.87	0.05	0.91	0.91
Avail Cap(c_a), veh/h	507	0	492	221	0	174	474	497	522	616	588	561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.2	0.0	40.6	55.5	0.0	52.9	35.0	45.5	45.5	26.4	40.8	40.8
Incr Delay (d2), s/veh	7.3	0.0	0.1	4.1	0.0	0.0	0.1	22.7	21.8	0.0	22.2	23.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	9.2	0.0	1.3	2.8	0.0	0.1	2.9	12.0	12.5	0.6	16.8	16.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	54.4	0.0	40.7	59.6	0.0	52.9	35.1	68.2	67.3	26.4	62.9	63.7
LnGrp LOS	D	A	D	E	A	D	D	E	E	C	E	E
Approach Vol, veh/h	348				92			813			972	
Approach Delay, s/veh	52.4				59.5			62.7			62.1	
Approach LOS	D				E			E			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	46.4	31.5		28.9	36.9	41.0		13.2				
Change Period (Y+Rc), s	* 5.2	* 5.7		* 6.1	* 5.2	* 5.6		5.8				
Max Green Setting (Gmax), s	* 16	* 33		* 34	* 9.8	* 39		14.2				
Max Q Clear Time (g_c+l1), s	3.5	23.7		21.2	8.7	33.0		7.7				
Green Ext Time (p_c), s	0.0	2.1		0.2	0.0	2.4		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			60.7									
HCM 6th LOS			E									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	296	183	90	140	126	688	33	973
V/c Ratio	0.85	0.42	0.57	0.47	0.75	0.43	0.12	0.65
Control Delay	67.3	12.1	66.3	8.4	79.6	28.6	44.8	29.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	12.1	66.3	8.4	79.6	28.6	44.8	29.1
Queue Length 50th (ft)	223	20	68	0	93	231	21	305
Queue Length 95th (ft)	301	77	119	31	#211	311	55	424
Internal Link Dist (ft)		589	263			309		573
Turn Bay Length (ft)	120			80	70		70	
Base Capacity (vph)	504	562	221	343	169	1589	276	1505
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.33	0.41	0.41	0.75	0.43	0.12	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

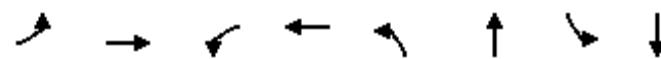
Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	6.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↖	↗	↑	↗
Traffic Vol, veh/h	103	155	162	101	91	185
Future Vol, veh/h	103	155	162	101	91	185
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	80	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	126	189	198	123	111	226
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	315	0	740	221
Stage 1	-	-	-	-	221	-
Stage 2	-	-	-	-	519	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1251	-	386	821
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	599	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1251	-	320	821
Mov Cap-2 Maneuver	-	-	-	-	320	-
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	497	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	5.2	14.7			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	320	821	-	-	1251	-
HCM Lane V/C Ratio	0.347	0.275	-	-	0.158	-
HCM Control Delay (s)	22.1	11	-	-	8.4	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	1.5	1.1	-	-	0.6	-

HCM 6th Signalized Intersection Summary
9: S Boyer Ave & Hwy 2

North Boyer Development (Peer Review)
2025 PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓		↑	↓		↑	↓	
Traffic Volume (veh/h)	159	411	0	77	411	1	79	145	33	91	141	134
Future Volume (veh/h)	159	411	0	77	411	1	79	145	33	91	141	134
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00		0.98	0.98		0.94	0.97	0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	173	447	0	84	447	1	86	158	21	99	153	82
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	296	532	0	289	524	1	282	410	54	331	288	154
Arrive On Green	0.16	0.28	0.00	0.16	0.28	0.28	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1795	1885	0	1795	1880	4	1129	1615	215	1183	1137	609
Grp Volume(v), veh/h	173	447	0	84	0	448	86	0	179	99	0	235
Grp Sat Flow(s), veh/h/ln	1795	1885	0	1795	0	1884	1129	0	1830	1183	0	1746
Q Serve(g_s), s	5.1	12.7	0.0	2.3	0.0	12.8	4.0	0.0	4.6	4.3	0.0	6.6
Cycle Q Clear(g_c), s	5.1	12.7	0.0	2.3	0.0	12.8	10.6	0.0	4.6	8.9	0.0	6.6
Prop In Lane	1.00			1.00			0.00	1.00		0.12	1.00	0.35
Lane Grp Cap(c), veh/h	296	532	0	289	0	525	282	0	464	331	0	443
V/C Ratio(X)	0.59	0.84	0.00	0.29	0.00	0.85	0.30	0.00	0.39	0.30	0.00	0.53
Avail Cap(c_a), veh/h	316	631	0	316	0	598	354	0	580	406	0	554
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	19.2	0.0	20.9	0.0	19.4	22.8	0.0	17.5	21.2	0.0	18.3
Incr Delay (d2), s/veh	1.4	7.5	0.0	0.2	0.0	9.4	0.2	0.0	0.2	0.2	0.0	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.1	6.0	0.0	0.9	0.0	6.4	1.0	0.0	1.8	1.1	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	23.3	26.6	0.0	21.2	0.0	28.8	23.1	0.0	17.7	21.4	0.0	18.6
LnGrp LOS	C	C	A	C	A	C	C	A	B	C	A	B
Approach Vol, veh/h		620			532			265			334	
Approach Delay, s/veh		25.7			27.6			19.5			19.4	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.3	21.4		20.0	15.5	21.2		20.0				
Change Period (Y+Rc), s	6.2	* 5.4		* 5.6	6.2	* 5.4		* 5.6				
Max Green Setting (Gmax), s	10.0	* 19		* 18	10.0	* 18		* 18				
Max Q Clear Time (g_c+l1), s	4.3	14.7		10.9	7.1	14.8		12.6				
Green Ext Time (p_c), s	0.0	0.8		0.7	0.1	0.6		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			24.1									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	173	447	84	448	86	194	99	299
v/c Ratio	0.45	0.61	0.23	0.75	0.47	0.46	0.37	0.68
Control Delay	27.0	22.0	24.3	29.4	29.1	21.3	23.5	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	22.0	24.3	29.4	29.1	21.3	23.5	23.6
Queue Length 50th (ft)	55	136	26	138	26	54	30	71
Queue Length 95th (ft)	119	#299	66	#312	65	105	67	144
Internal Link Dist (ft)		740		687		453		798
Turn Bay Length (ft)	100		90				75	
Base Capacity (vph)	402	830	369	699	299	686	439	677
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.54	0.23	0.64	0.29	0.28	0.23	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection

Int Delay, s/veh 17.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↔	↔		↑	↑		↔	↔	
Traffic Vol, veh/h	190	1	136	1	0	4	103	294	2	5	265	171
Future Vol, veh/h	190	1	136	1	0	4	103	294	2	5	265	171
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	0	-	70	-	-	-	160	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	209	1	149	1	0	4	113	323	2	5	291	188

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	947	951	385	1025	1044	329	479	0	0	330	0	0
Stage 1	395	395	-	555	555	-	-	-	-	-	-	-
Stage 2	552	556	-	470	489	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	241	260	663	213	229	712	1083	-	-	1229	-	-
Stage 1	630	605	-	516	513	-	-	-	-	-	-	-
Stage 2	518	513	-	574	549	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	219	230	663	150	203	709	1083	-	-	1223	-	-
Mov Cap-2 Maneuver	219	230	-	150	203	-	-	-	-	-	-	-
Stage 1	564	601	-	460	458	-	-	-	-	-	-	-
Stage 2	461	458	-	441	546	-	-	-	-	-	-	-

Approach	EB	WB			NB			SB		
HCM Control Delay, s	60.6	14			2.2			0.1		
HCM LOS	F	B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR	
Capacity (veh/h)	1083	-	-	219	654	406	1223	-	-	
HCM Lane V/C Ratio	0.105	-	-	0.953	0.23	0.014	0.004	-	-	
HCM Control Delay (s)	8.7	-	-	95.6	12.1	14	8	0	-	
HCM Lane LOS	A	-	-	F	B	B	A	A	-	
HCM 95th %tile Q(veh)	0.3	-	-	8.2	0.9	0	0	-	-	

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
2025+P PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	281	29	159	14	70	130	143	635	5	31	642	272
Future Volume (veh/h)	281	29	159	14	70	130	143	635	5	31	642	272
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00		0.92	1.00		0.99	1.00	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	302	31	24	15	75	2	154	683	4	33	690	254
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	346	188	145	19	97	91	467	784	5	612	757	279
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.26	0.21	0.21	0.34	0.30	0.30
Sat Flow, veh/h	1795	975	755	312	1558	1467	1795	3651	21	1795	2556	941
Grp Volume(v), veh/h	302	0	55	90	0	2	154	335	352	33	483	461
Grp Sat Flow(s), veh/h/ln	1795	0	1729	1870	0	1467	1795	1791	1881	1795	1791	1706
Q Serve(g_s), s	19.6	0.0	3.2	5.7	0.0	0.2	8.3	21.7	21.7	1.5	31.2	31.2
Cycle Q Clear(g_c), s	19.6	0.0	3.2	5.7	0.0	0.2	8.3	21.7	21.7	1.5	31.2	31.2
Prop In Lane	1.00			0.44	0.17		1.00	1.00		0.01	1.00	0.55
Lane Grp Cap(c), veh/h	346	0	333	116	0	91	467	385	404	612	531	506
V/C Ratio(X)	0.87	0.00	0.17	0.78	0.00	0.02	0.33	0.87	0.87	0.05	0.91	0.91
Avail Cap(c_a), veh/h	507	0	489	221	0	174	467	497	522	612	588	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.0	0.0	40.4	55.5	0.0	52.9	35.9	45.5	45.5	26.6	40.7	40.7
Incr Delay (d2), s/veh	8.1	0.0	0.1	4.1	0.0	0.0	0.2	22.7	21.8	0.0	22.3	23.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	9.5	0.0	1.4	2.8	0.0	0.1	3.7	12.0	12.5	0.6	16.9	16.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	55.1	0.0	40.5	59.6	0.0	52.9	36.1	68.2	67.3	26.6	63.0	63.8
LnGrp LOS	E	A	D	E	A	D	D	E	E	C	E	E
Approach Vol, veh/h	357				92			841			977	
Approach Delay, s/veh	52.8				59.5			62.0			62.1	
Approach LOS	D				E			E			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	46.1	31.5		29.2	36.4	41.2		13.2				
Change Period (Y+Rc), s	* 5.2	* 5.7		* 6.1	* 5.2	* 5.6		5.8				
Max Green Setting (Gmax), s	* 16	* 33		* 34	* 9.8	* 39		14.2				
Max Q Clear Time (g_c+l1), s	3.5	23.7		21.6	10.3	33.2		7.7				
Green Ext Time (p_c), s	0.0	2.1		0.2	0.0	2.3		0.1				
Intersection Summary												
HCM 6th Ctrl Delay				60.5								
HCM 6th LOS				E								
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	302	202	90	140	154	688	33	982
v/c Ratio	0.85	0.44	0.57	0.47	0.74	0.44	0.12	0.69
Control Delay	67.2	11.6	66.3	8.4	74.2	29.0	44.7	31.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	11.6	66.3	8.4	74.2	29.0	44.7	31.4
Queue Length 50th (ft)	227	20	68	0	115	235	21	314
Queue Length 95th (ft)	306	80	119	31	#268	312	55	431
Internal Link Dist (ft)		589	263			309		573
Turn Bay Length (ft)	120			80	70		70	
Base Capacity (vph)	504	574	221	343	207	1571	279	1423
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.35	0.41	0.41	0.74	0.44	0.12	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

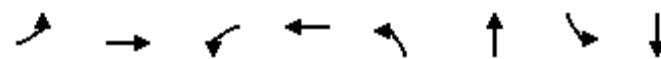
Intersection						
Int Delay, s/veh	7.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↖	↗	↑	↗
Traffic Vol, veh/h	103	155	174	101	91	202
Future Vol, veh/h	103	155	174	101	91	202
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	80	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	126	189	212	123	111	246
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	315	0	768	221
Stage 1	-	-	-	-	221	-
Stage 2	-	-	-	-	547	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1251	-	371	821
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	582	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1251	-	303	821
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	476	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	5.4	15.1			
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	303	821	-	-	1251	-
HCM Lane V/C Ratio	0.366	0.3	-	-	0.17	-
HCM Control Delay (s)	23.6	11.3	-	-	8.5	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	1.6	1.3	-	-	0.6	-

HCM 6th Signalized Intersection Summary
9: S Boyer Ave & Hwy 2

North Boyer Development (Peer Review)
2025+P PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓		↑	↓		↑	↓	
Traffic Volume (veh/h)	176	411	0	77	411	1	79	145	33	91	141	146
Future Volume (veh/h)	176	411	0	77	411	1	79	145	33	91	141	146
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.98		0.94	0.97		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	191	447	0	84	447	1	86	158	21	99	153	89
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	296	529	0	290	521	1	276	412	55	331	281	163
Arrive On Green	0.17	0.28	0.00	0.16	0.28	0.28	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1795	1885	0	1795	1880	4	1122	1615	215	1184	1100	640
Grp Volume(v), veh/h	191	447	0	84	0	448	86	0	179	99	0	242
Grp Sat Flow(s), veh/h/ln	1795	1885	0	1795	0	1884	1122	0	1830	1184	0	1739
Q Serve(g_s), s	5.7	12.9	0.0	2.4	0.0	13.0	4.1	0.0	4.7	4.4	0.0	7.0
Cycle Q Clear(g_c), s	5.7	12.9	0.0	2.4	0.0	13.0	11.1	0.0	4.7	9.0	0.0	7.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.12	1.00		0.37
Lane Grp Cap(c), veh/h	296	529	0	290	0	522	276	0	467	331	0	444
V/C Ratio(X)	0.64	0.85	0.00	0.29	0.00	0.86	0.31	0.00	0.38	0.30	0.00	0.55
Avail Cap(c_a), veh/h	311	620	0	311	0	587	339	0	570	377	0	512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	19.6	0.0	21.3	0.0	19.8	23.4	0.0	17.8	21.5	0.0	18.6
Incr Delay (d2), s/veh	3.1	8.1	0.0	0.2	0.0	10.2	0.2	0.0	0.2	0.2	0.0	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.5	6.3	0.0	0.9	0.0	6.6	1.0	0.0	1.8	1.1	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.7	27.7	0.0	21.5	0.0	30.0	23.7	0.0	18.0	21.7	0.0	19.0
LnGrp LOS	C	C	A	C	A	C	C	A	B	C	A	B
Approach Vol, veh/h		638			532			265			341	
Approach Delay, s/veh		27.1			28.6			19.8			19.8	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.5	21.6		20.6	15.7	21.4		20.6				
Change Period (Y+Rc), s	6.2	* 5.4		5.9	6.2	* 5.4		* 5.9				
Max Green Setting (Gmax), s	10.0	* 19		17.0	10.0	* 18		* 18				
Max Q Clear Time (g_c+l1), s	4.4	14.9		11.0	7.7	15.0		13.1				
Green Ext Time (p_c), s	0.0	0.7		0.6	0.1	0.6		0.4				
Intersection Summary												
HCM 6th Ctrl Delay		25.1										
HCM 6th LOS			C									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	191	447	84	448	86	194	99	312
V/c Ratio	0.57	0.56	0.26	0.83	0.55	0.47	0.40	0.74
Control Delay	31.2	20.9	25.2	36.1	34.3	21.6	24.4	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	20.9	25.2	36.1	34.3	21.6	24.4	26.6
Queue Length 50th (ft)	63	139	26	142	27	54	30	75
Queue Length 95th (ft)	#145	#299	66	#312	67	105	68	150
Internal Link Dist (ft)		740		687		453		798
Turn Bay Length (ft)	100		90				75	
Base Capacity (vph)	348	805	320	606	230	598	373	590
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.56	0.26	0.74	0.37	0.32	0.27	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection

Int Delay, s/veh 16

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↔	↔		↑	↑		↔	↔	
Traffic Vol, veh/h	196	1	154	1	0	4	116	235	3	5	234	180
Future Vol, veh/h	196	1	154	1	0	4	116	235	3	5	234	180
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	0	-	70	-	-	-	160	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	215	1	169	1	0	4	127	258	3	5	257	198

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	882	886	356	970	984	265	455	0	0	266	0	0
Stage 1	366	366	-	519	519	-	-	-	-	-	-	-
Stage 2	516	520	-	451	465	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	267	284	688	233	248	774	1106	-	-	1298	-	-
Stage 1	653	623	-	540	533	-	-	-	-	-	-	-
Stage 2	542	532	-	588	563	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	241	249	688	158	217	770	1106	-	-	1292	-	-
Mov Cap-2 Maneuver	241	249	-	158	217	-	-	-	-	-	-	-
Stage 1	578	620	-	476	470	-	-	-	-	-	-	-
Stage 2	477	469	-	440	560	-	-	-	-	-	-	-

Approach	EB	WB			NB			SB			
HCM Control Delay, s	48.4	13.4			2.8			0.1			
HCM LOS	E	B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR		
Capacity (veh/h)	1106	-	-	241	680	434	1292	-	-		
HCM Lane V/C Ratio	0.115	-	-	0.894	0.25	0.013	0.004	-	-		
HCM Control Delay (s)	8.7	-	-	77.1	12.1	13.4	7.8	0	-		
HCM Lane LOS	A	-	-	F	B	B	A	A	-		
HCM 95th %tile Q(veh)	0.4	-	-	7.5	1	0	0	-	-		

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
2030 PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑			↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (veh/h)	312	32	160	16	80	147	132	721	5	35	729	299
Future Volume (veh/h)	312	32	160	16	80	147	132	721	5	35	729	299
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00		0.93	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	335	34	27	17	86	3	142	775	4	38	784	287
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	372	200	159	22	109	103	379	869	4	530	826	302
Arrive On Green	0.21	0.21	0.21	0.07	0.07	0.07	0.21	0.24	0.24	0.30	0.32	0.32
Sat Flow, veh/h	1795	964	765	309	1561	1480	1795	3654	19	1795	2562	937
Grp Volume(v), veh/h	335	0	61	103	0	3	142	380	399	38	548	523
Grp Sat Flow(s), veh/h/ln	1795	0	1729	1870	0	1480	1795	1791	1882	1795	1791	1708
Q Serve(g_s), s	21.8	0.0	3.5	6.5	0.0	0.2	8.1	24.6	24.6	1.8	35.8	35.9
Cycle Q Clear(g_c), s	21.8	0.0	3.5	6.5	0.0	0.2	8.1	24.6	24.6	1.8	35.8	35.9
Prop In Lane	1.00			0.44	0.17		1.00	1.00		0.01	1.00	0.55
Lane Grp Cap(c), veh/h	372	0	358	131	0	103	379	426	448	530	578	551
V/C Ratio(X)	0.90	0.00	0.17	0.79	0.00	0.03	0.37	0.89	0.89	0.07	0.95	0.95
Avail Cap(c_a), veh/h	507	0	488	221	0	175	379	497	522	530	588	561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	0.0	39.1	54.9	0.0	52.0	40.5	44.2	44.2	30.5	39.7	39.7
Incr Delay (d2), s/veh	12.8	0.0	0.1	4.0	0.0	0.0	0.2	23.5	22.6	0.0	26.7	27.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	11.0	0.0	1.5	3.2	0.0	0.1	3.6	13.6	14.2	0.8	19.8	19.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	59.1	0.0	39.2	58.9	0.0	52.1	40.8	67.7	66.9	30.5	66.4	67.4
LnGrp LOS	E	A	D	E	A	D	D	E	E	C	E	E
Approach Vol, veh/h		396			106			921			1109	
Approach Delay, s/veh		56.0			58.7			63.2			65.6	
Approach LOS		E			E			E			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	40.6	34.2		31.0	30.5	44.3		14.2				
Change Period (Y+Rc), s	* 5.2	* 5.7		* 6.1	* 5.2	* 5.6		5.8				
Max Green Setting (Gmax), s	* 16	* 33		* 34	* 9.8	* 39		14.2				
Max Q Clear Time (g_c+l1), s	3.8	26.6		23.8	10.1	37.9		8.5				
Green Ext Time (p_c), s	0.0	1.9		0.2	0.0	0.8		0.1				
Intersection Summary												
HCM 6th Ctrl Delay		62.9										
HCM 6th LOS			E									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	335	206	103	158	142	780	38	1106
v/c Ratio	0.87	0.43	0.62	0.52	0.89	0.51	0.15	0.77
Control Delay	66.8	11.1	68.2	11.5	103.0	30.7	46.9	34.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.8	11.1	68.2	11.5	103.0	30.7	46.9	34.3
Queue Length 50th (ft)	251	21	78	0	112	275	25	361
Queue Length 95th (ft)	335	80	134	48	#243	370	61	#571
Internal Link Dist (ft)		589	263			309		573
Turn Bay Length (ft)	120			80	70		70	
Base Capacity (vph)	504	576	220	343	159	1540	255	1439
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.36	0.47	0.46	0.89	0.51	0.15	0.77

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	7.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↑	↑	↑
Traffic Vol, veh/h	116	176	184	115	103	210
Future Vol, veh/h	116	176	184	115	103	210
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	80	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	141	215	224	140	126	256
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	356	0	837	249
Stage 1	-	-	-	-	249	-
Stage 2	-	-	-	-	588	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1208	-	338	792
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	557	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1208	-	270	792
Mov Cap-2 Maneuver	-	-	-	-	270	-
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	445	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	5.3	17.5			
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	270	792	-	-	1208	-
HCM Lane V/C Ratio	0.465	0.323	-	-	0.186	-
HCM Control Delay (s)	29.4	11.7	-	-	8.7	0
HCM Lane LOS	D	B	-	-	A	A
HCM 95th %tile Q(veh)	2.3	1.4	-	-	0.7	-

HCM 6th Signalized Intersection Summary
9: S Boyer Ave & Hwy 2

North Boyer Development (Peer Review)
2030 PM

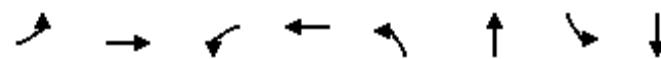
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓		↑	↓		↑	↓	
Traffic Volume (veh/h)	180	466	0	88	466	1	89	165	38	103	160	151
Future Volume (veh/h)	180	466	0	88	466	1	89	165	38	103	160	151
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00		0.98	0.98		0.94	0.98	0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	196	507	0	96	507	1	97	179	26	112	174	101
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	282	562	0	274	552	1	261	429	62	322	296	172
Arrive On Green	0.16	0.30	0.00	0.15	0.29	0.29	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1795	1885	0	1795	1881	4	1092	1595	232	1159	1102	639
Grp Volume(v), veh/h	196	507	0	96	0	508	97	0	205	112	0	275
Grp Sat Flow(s), veh/h/ln	1795	1885	0	1795	0	1884	1092	0	1826	1159	0	1741
Q Serve(g_s), s	6.3	15.8	0.0	2.9	0.0	16.0	5.2	0.0	5.7	5.4	0.0	8.4
Cycle Q Clear(g_c), s	6.3	15.8	0.0	2.9	0.0	16.0	13.6	0.0	5.7	11.1	0.0	8.4
Prop In Lane	1.00			0.00	1.00		0.00	1.00		0.13	1.00	0.37
Lane Grp Cap(c), veh/h	282	562	0	274	0	553	261	0	491	322	0	468
V/C Ratio(X)	0.69	0.90	0.00	0.35	0.00	0.92	0.37	0.00	0.42	0.35	0.00	0.59
Avail Cap(c_a), veh/h	293	584	0	293	0	553	288	0	536	350	0	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.4	20.7	0.0	23.3	0.0	21.0	25.4	0.0	18.5	23.0	0.0	19.5
Incr Delay (d2), s/veh	5.5	16.3	0.0	0.3	0.0	20.2	0.3	0.0	0.2	0.2	0.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.9	8.8	0.0	1.2	0.0	9.5	1.3	0.0	2.2	1.4	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.9	37.0	0.0	23.5	0.0	41.1	25.7	0.0	18.7	23.3	0.0	20.3
LnGrp LOS	C	D	A	C	A	D	C	A	B	C	A	C
Approach Vol, veh/h	703				604			302			387	
Approach Delay, s/veh	35.0				38.3			20.9			21.2	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.6	23.7		22.1	15.8	23.4		22.1				
Change Period (Y+Rc), s	6.2	* 5.4		* 5.6	6.2	* 5.4		* 5.6				
Max Green Setting (Gmax), s	10.0	* 19		* 18	10.0	* 18		* 18				
Max Q Clear Time (g_c+l1), s	4.9	17.8		13.1	8.3	18.0		15.6				
Green Ext Time (p_c), s	0.0	0.3		0.6	0.0	0.0		0.3				

Intersection Summary

HCM 6th Ctrl Delay	31.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	196	507	96	508	97	220	112	338
v/c Ratio	0.60	0.71	0.32	0.90	0.71	0.53	0.47	0.78
Control Delay	33.0	27.7	26.5	43.6	50.1	23.0	26.6	29.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	27.7	26.5	43.6	50.1	23.0	26.6	29.5
Queue Length 50th (ft)	66	169	31	174	32	63	35	88
Queue Length 95th (ft)	#150	#358	73	#370	#92	119	76	168
Internal Link Dist (ft)		740		687		453		798
Turn Bay Length (ft)	100		90				75	
Base Capacity (vph)	331	711	304	576	188	568	327	571
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.71	0.32	0.88	0.52	0.39	0.34	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection

Int Delay, s/veh 36.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Vol, veh/h	213	1	154	1	0	4	116	322	3	5	293	192
Future Vol, veh/h	213	1	154	1	0	4	116	322	3	5	293	192
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	0	-	70	-	-	-	160	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	234	1	169	1	0	4	127	354	3	5	322	211

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	1050	1054	428	1138	1158	361	533	0	0	362	0	0
Stage 1	438	438	-	615	615	-	-	-	-	-	-	-
Stage 2	612	616	-	523	543	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 205	226	627	179	196	684	1035	-	-	1197	-	-
Stage 1	597	579	-	479	482	-	-	-	-	-	-	-
Stage 2	480	482	-	537	520	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 184	196	627	117	170	681	1035	-	-	1191	-	-
Mov Cap-2 Maneuver	~ 184	196	-	117	170	-	-	-	-	-	-	-
Stage 1	524	576	-	418	421	-	-	-	-	-	-	-
Stage 2	418	421	-	389	517	-	-	-	-	-	-	-

Approach	EB	WB			NB			SB		
HCM Control Delay, s	125.9	15.5			2.4			0.1		
HCM LOS	F	C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR	
Capacity (veh/h)	1035	-	-	184	618	347	1191	-	-	
HCM Lane V/C Ratio	0.123	-	-	1.272	0.276	0.016	0.005	-	-	
HCM Control Delay (s)	9	-	-	208.1	13	15.5	8	0	-	
HCM Lane LOS	A	-	-	F	B	C	A	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	13	1.1	0	0	-	-	

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
2030+P PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑			↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (veh/h)	318	32	178	16	80	147	158	721	5	35	729	308
Future Volume (veh/h)	318	32	178	16	80	147	158	721	5	35	729	308
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00		0.93	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	342	34	31	17	86	3	170	775	4	38	784	293
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	378	189	172	22	109	103	371	869	4	524	824	308
Arrive On Green	0.21	0.21	0.21	0.07	0.07	0.07	0.21	0.24	0.24	0.29	0.32	0.32
Sat Flow, veh/h	1795	899	819	309	1561	1480	1795	3654	19	1795	2546	951
Grp Volume(v), veh/h	342	0	65	103	0	3	170	380	399	38	551	526
Grp Sat Flow(s), veh/h/ln	1795	0	1718	1870	0	1480	1795	1791	1882	1795	1791	1705
Q Serve(g_s), s	22.3	0.0	3.7	6.5	0.0	0.2	10.0	24.6	24.6	1.8	36.1	36.2
Cycle Q Clear(g_c), s	22.3	0.0	3.7	6.5	0.0	0.2	10.0	24.6	24.6	1.8	36.1	36.2
Prop In Lane	1.00			0.48	0.17		1.00	1.00		0.01	1.00	
Lane Grp Cap(c), veh/h	378	0	362	131	0	103	371	426	448	524	580	552
V/C Ratio(X)	0.91	0.00	0.18	0.79	0.00	0.03	0.46	0.89	0.89	0.07	0.95	0.95
Avail Cap(c_a), veh/h	507	0	485	221	0	175	371	497	522	524	588	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	0.0	38.9	54.9	0.0	52.0	41.7	44.2	44.2	30.7	39.6	39.7
Incr Delay (d2), s/veh	13.8	0.0	0.1	4.0	0.0	0.0	0.3	23.5	22.6	0.0	27.1	28.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	11.3	0.0	1.6	3.2	0.0	0.1	4.5	13.6	14.2	0.8	20.0	19.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.0	0.0	39.0	58.9	0.0	52.1	42.0	67.7	66.9	30.8	66.7	67.8
LnGrp LOS	E	A	D	E	A	D	D	E	E	C	E	E
Approach Vol, veh/h	407				106			949			1115	
Approach Delay, s/veh	56.6				58.7			62.8			66.0	
Approach LOS	E				E			E			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	40.2	34.2		31.4	30.0	44.4		14.2				
Change Period (Y+Rc), s	* 5.2	* 5.7		* 6.1	* 5.2	* 5.6		5.8				
Max Green Setting (Gmax), s	* 16	* 33		* 34	* 9.8	* 39		14.2				
Max Q Clear Time (g_c+l1), s	3.8	26.6		24.3	12.0	38.2		8.5				
Green Ext Time (p_c), s	0.0	1.9		0.2	0.0	0.7		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			63.0									
HCM 6th LOS			E									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	342	225	103	158	170	780	38	1115
v/c Ratio	0.87	0.45	0.62	0.52	0.99	0.51	0.15	0.79
Control Delay	67.2	10.7	68.2	11.5	122.2	30.9	47.0	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	10.7	68.2	11.5	122.2	30.9	47.0	35.7
Queue Length 50th (ft)	256	21	78	0	~156	276	25	368
Queue Length 95th (ft)	343	83	134	48	#298	370	61	#577
Internal Link Dist (ft)		589	263			309		573
Turn Bay Length (ft)	120			80	70			70
Base Capacity (vph)	504	589	220	343	171	1531	254	1406
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.38	0.47	0.46	0.99	0.51	0.15	0.79

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	8.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↖	↗	↑	↗
Traffic Vol, veh/h	116	176	196	115	103	227
Future Vol, veh/h	116	176	196	115	103	227
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	80	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	141	215	239	140	126	277
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	356	0	867	249
Stage 1	-	-	-	-	249	-
Stage 2	-	-	-	-	618	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1208	-	325	792
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	540	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1208	-	255	792
Mov Cap-2 Maneuver	-	-	-	-	255	-
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	424	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	5.5	18.3			
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	255	792	-	-	1208	-
HCM Lane V/C Ratio	0.493	0.35	-	-	0.198	-
HCM Control Delay (s)	32.1	12	-	-	8.7	0
HCM Lane LOS	D	B	-	-	A	A
HCM 95th %tile Q(veh)	2.5	1.6	-	-	0.7	-

HCM 6th Signalized Intersection Summary
9: S Boyer Ave & Hwy 2

North Boyer Development (Peer Review)
2030+P PM

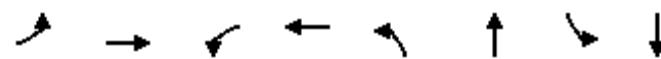
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓		↑	↓		↑	↓	
Traffic Volume (veh/h)	197	466	0	88	466	1	89	165	38	103	160	163
Future Volume (veh/h)	197	466	0	88	466	1	89	165	38	103	160	163
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.98		0.94	0.98		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	214	507	0	96	507	1	97	179	26	112	174	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	283	561	0	273	548	1	257	434	63	325	289	183
Arrive On Green	0.16	0.30	0.00	0.15	0.29	0.29	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1795	1885	0	1795	1881	4	1084	1595	232	1159	1062	672
Grp Volume(v), veh/h	214	507	0	96	0	508	97	0	205	112	0	284
Grp Sat Flow(s), veh/h/ln	1795	1885	0	1795	0	1884	1084	0	1826	1159	0	1734
Q Serve(g_s), s	7.0	16.0	0.0	3.0	0.0	16.1	5.3	0.0	5.7	5.4	0.0	8.8
Cycle Q Clear(g_c), s	7.0	16.0	0.0	3.0	0.0	16.1	14.1	0.0	5.7	11.1	0.0	8.8
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.13	1.00		0.39
Lane Grp Cap(c), veh/h	283	561	0	273	0	549	257	0	497	325	0	472
V/C Ratio(X)	0.76	0.90	0.00	0.35	0.00	0.92	0.38	0.00	0.41	0.34	0.00	0.60
Avail Cap(c_a), veh/h	291	580	0	291	0	549	278	0	532	329	0	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.9	20.8	0.0	23.5	0.0	21.2	25.7	0.0	18.4	23.0	0.0	19.6
Incr Delay (d2), s/veh	9.3	16.8	0.0	0.3	0.0	21.3	0.3	0.0	0.2	0.2	0.0	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	3.5	9.0	0.0	1.2	0.0	9.7	1.3	0.0	2.2	1.4	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	34.1	37.6	0.0	23.7	0.0	42.5	26.0	0.0	18.6	23.2	0.0	21.0
LnGrp LOS	C	D	A	C	A	D	C	A	B	C	A	C
Approach Vol, veh/h		721			604			302			396	
Approach Delay, s/veh		36.6			39.5			21.0			21.6	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.6	23.8		22.4	15.9	23.4		22.4				
Change Period (Y+Rc), s	6.2	* 5.4		* 5.6	6.2	* 5.4		* 5.6				
Max Green Setting (Gmax), s	10.0	* 19		* 17	10.0	* 18		* 18				
Max Q Clear Time (g_c+l1), s	5.0	18.0		13.1	9.0	18.1		16.1				
Green Ext Time (p_c), s	0.0	0.3		0.6	0.0	0.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			32.2									
HCM 6th LOS			C									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
9: S Boyer Ave & Hwy 2

North Boyer Development (Peer Review)

2030+P PM



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	214	507	96	508	97	220	112	351
V/c Ratio	0.66	0.72	0.32	0.90	0.75	0.52	0.46	0.80
Control Delay	36.0	27.8	26.6	43.9	57.6	22.9	26.4	30.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	27.8	26.6	43.9	57.6	22.9	26.4	30.6
Queue Length 50th (ft)	74	171	31	176	33	63	35	92
Queue Length 95th (ft)	#170	#358	73	#370	#97	119	76	175
Internal Link Dist (ft)		740		687		453		798
Turn Bay Length (ft)	100		90				75	
Base Capacity (vph)	330	709	303	574	174	567	326	570
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.72	0.32	0.89	0.56	0.39	0.34	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

APPENDIX B
SYNCHRO REPORT SHEETS
HWY 2 & LARCH ST - UATP MIDTERM PROJECT ADDED

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
Existing PM + UATP Mitigation

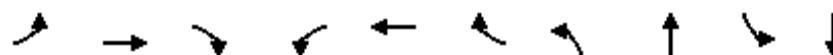
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (veh/h)	231	24	118	12	59	109	98	533	4	26	539	221
Future Volume (veh/h)	231	24	118	12	59	109	98	533	4	26	539	221
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.98	0.92		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	248	26	30	13	63	0	105	573	4	28	580	204
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	340	460	383	122	93	79	710	2397	17	225	674	236
Arrive On Green	0.14	0.24	0.24	0.05	0.05	0.00	0.35	0.66	0.66	0.26	0.26	0.26
Sat Flow, veh/h	1795	1885	1570	1252	1885	1598	1795	3646	25	840	2592	910
Grp Volume(v), veh/h	248	26	30	13	63	0	105	281	296	28	400	384
Grp Sat Flow(s), veh/h/ln	1795	1885	1570	1252	1885	1598	1795	1791	1880	840	1791	1711
Q Serve(g_s), s	15.2	1.3	1.8	1.2	3.9	0.0	0.0	7.7	7.7	3.3	25.6	25.7
Cycle Q Clear(g_c), s	15.2	1.3	1.8	1.2	3.9	0.0	0.0	7.7	7.7	11.0	25.6	25.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.53
Lane Grp Cap(c), veh/h	340	460	383	122	93	79	710	1178	1236	225	465	445
V/C Ratio(X)	0.73	0.06	0.08	0.11	0.68	0.00	0.15	0.24	0.24	0.12	0.86	0.86
Avail Cap(c_a), veh/h	439	643	535	177	176	149	710	1178	1236	352	737	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.6	34.8	34.9	54.8	56.1	0.0	24.9	8.3	8.4	40.1	42.3	42.4
Incr Delay (d2), s/veh	2.8	0.0	0.0	0.1	3.2	0.0	0.0	0.5	0.5	1.1	18.4	19.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	7.0	0.6	0.7	0.4	2.0	0.0	2.0	3.0	3.1	0.8	13.6	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.4	34.8	35.0	54.9	59.2	0.0	25.0	8.8	8.8	41.3	60.7	61.8
LnGrp LOS	D	C	C	D	E	A	C	A	A	D	E	E
Approach Vol, veh/h	304				76			682			812	
Approach Delay, s/veh	44.3				58.5			11.3			60.6	
Approach LOS	D				E			B			E	
Timer - Assigned Phs	2		4		5	6	7	8				
Phs Duration (G+Y+Rc), s	84.6		35.4		47.8	36.8	23.4	12.0				
Change Period (Y+Rc), s	* 5.7		* 6.1		* 5.7	* 5.6	* 6.1	* 6.1				
Max Green Setting (Gmax), s	* 67		* 41		* 13	* 49	* 24	* 11				
Max Q Clear Time (g_c+l1), s	9.7		3.8		2.0	27.7	17.2	5.9				
Green Ext Time (p_c), s	2.4		0.1		0.1	3.5	0.1	0.1				
Intersection Summary												
HCM 6th Ctrl Delay		39.9										
HCM 6th LOS		D										
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)

Existing PM + UATP Mitigation



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	248	26	127	13	63	117	105	577	28	818
v/c Ratio	0.62	0.05	0.23	0.14	0.48	0.50	0.26	0.27	0.07	0.48
Control Delay	40.3	26.8	5.4	53.9	65.0	14.5	16.3	12.5	20.9	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	26.8	5.4	53.9	65.0	14.5	16.3	12.5	20.9	21.2
Queue Length 50th (ft)	157	14	0	10	48	0	32	103	11	197
Queue Length 95th (ft)	207	32	39	30	92	46	70	167	35	311
Internal Link Dist (ft)		589			263			309		573
Turn Bay Length (ft)	120		80	120		80	70		70	
Base Capacity (vph)	436	656	623	129	177	267	466	2201	382	1722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.04	0.20	0.10	0.36	0.44	0.23	0.26	0.07	0.48

Intersection Summary

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
2025 PM + UATP Mitigation

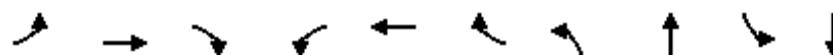
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (veh/h)	275	29	141	14	70	130	117	635	5	31	642	263
Future Volume (veh/h)	275	29	141	14	70	130	117	635	5	31	642	263
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.98	0.93		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	296	31	40	15	75	0	126	683	5	33	690	246
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	382	517	431	130	106	90	577	2287	17	226	786	280
Arrive On Green	0.17	0.27	0.27	0.06	0.06	0.00	0.28	0.63	0.63	0.30	0.30	0.30
Sat Flow, veh/h	1795	1885	1573	1249	1885	1598	1795	3644	27	759	2581	920
Grp Volume(v), veh/h	296	31	40	15	75	0	126	336	352	33	479	457
Grp Sat Flow(s), veh/h/ln	1795	1885	1573	1249	1885	1598	1795	1791	1880	759	1791	1711
Q Serve(g_s), s	18.0	1.5	2.3	1.4	4.7	0.0	0.8	10.3	10.3	4.3	30.4	30.4
Cycle Q Clear(g_c), s	18.0	1.5	2.3	1.4	4.7	0.0	0.8	10.3	10.3	14.6	30.4	30.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.54
Lane Grp Cap(c), veh/h	382	517	431	130	106	90	577	1124	1180	226	545	521
V/C Ratio(X)	0.77	0.06	0.09	0.12	0.71	0.00	0.22	0.30	0.30	0.15	0.88	0.88
Avail Cap(c_a), veh/h	440	643	536	177	176	149	577	1124	1180	307	737	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.7	32.1	32.4	54.1	55.7	0.0	31.1	10.2	10.2	38.3	39.6	39.6
Incr Delay (d2), s/veh	6.1	0.0	0.0	0.1	3.2	0.0	0.1	0.7	0.6	1.4	17.9	18.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	8.6	0.7	0.9	0.4	2.3	0.0	2.7	4.2	4.4	0.9	16.0	15.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	47.8	32.2	32.5	54.2	58.9	0.0	31.2	10.9	10.9	39.7	57.5	58.1
LnGrp LOS	D	C	C	D	E	A	C	B	B	D	E	E
Approach Vol, veh/h	367				90			814			969	
Approach Delay, s/veh	44.8				58.1			14.1			57.2	
Approach LOS	D				E			B			E	
Timer - Assigned Phs	2		4		5	6	7	8				
Phs Duration (G+Y+Rc), s	81.0		39.0		38.8	42.2	26.2	12.8				
Change Period (Y+Rc), s	* 5.7		* 6.1		* 5.7	* 5.6	* 6.1	* 6.1				
Max Green Setting (Gmax), s	* 67		* 41		* 13	* 49	* 24	* 11				
Max Q Clear Time (g_c+l1), s	12.3		4.3		2.8	32.4	20.0	6.7				
Green Ext Time (p_c), s	2.9		0.1		0.1	4.1	0.1	0.1				
Intersection Summary												
HCM 6th Ctrl Delay		39.5										
HCM 6th LOS		D										
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)

2025 PM + UATP Mitigation



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	296	31	152	15	75	140	126	688	33	973
v/c Ratio	0.68	0.05	0.26	0.15	0.54	0.57	0.37	0.33	0.11	0.61
Control Delay	41.5	26.4	5.3	54.2	67.8	18.0	22.8	13.9	23.5	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	26.4	5.3	54.2	67.8	18.0	22.8	13.9	23.5	26.1
Queue Length 50th (ft)	183	16	0	11	57	0	43	141	15	281
Queue Length 95th (ft)	263	38	45	33	106	62	75	188	41	387
Internal Link Dist (ft)		589			263			309		573
Turn Bay Length (ft)	120		80	120		80	70		70	
Base Capacity (vph)	454	656	640	127	175	274	382	2131	301	1623
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.05	0.24	0.12	0.43	0.51	0.33	0.32	0.11	0.60

Intersection Summary

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
2025+P PM + UATP Mitigation

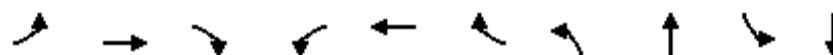
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (veh/h)	281	29	159	14	70	130	143	635	5	31	642	272
Future Volume (veh/h)	281	29	159	14	70	130	143	635	5	31	642	272
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.98	0.93		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	302	31	45	15	75	0	154	683	5	33	690	253
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	388	523	436	130	106	90	567	2276	17	227	785	288
Arrive On Green	0.17	0.28	0.28	0.06	0.06	0.00	0.27	0.62	0.62	0.31	0.31	0.31
Sat Flow, veh/h	1795	1885	1573	1244	1885	1598	1795	3644	27	759	2560	938
Grp Volume(v), veh/h	302	31	45	15	75	0	154	336	352	33	483	460
Grp Sat Flow(s), veh/h/ln	1795	1885	1573	1244	1885	1598	1795	1791	1880	759	1791	1707
Q Serve(g_s), s	18.4	1.5	2.6	1.4	4.7	0.0	2.3	10.4	10.4	4.3	30.7	30.7
Cycle Q Clear(g_c), s	18.4	1.5	2.6	1.4	4.7	0.0	2.3	10.4	10.4	14.6	30.7	30.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.55
Lane Grp Cap(c), veh/h	388	523	436	130	106	90	567	1118	1174	227	550	524
V/C Ratio(X)	0.78	0.06	0.10	0.12	0.71	0.00	0.27	0.30	0.30	0.15	0.88	0.88
Avail Cap(c_a), veh/h	440	643	536	176	176	149	567	1118	1174	307	737	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.6	31.9	32.3	54.1	55.7	0.0	31.9	10.4	10.4	38.1	39.5	39.5
Incr Delay (d2), s/veh	6.5	0.0	0.0	0.1	3.2	0.0	0.1	0.7	0.7	1.3	17.9	18.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	8.8	0.7	1.0	0.4	2.3	0.0	3.4	4.2	4.4	0.9	16.1	15.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	48.1	31.9	32.3	54.2	58.9	0.0	32.0	11.1	11.1	39.5	57.3	58.0
LnGrp LOS	D	C	C	D	E	A	C	B	B	D	E	E
Approach Vol, veh/h	378				90			842			976	
Approach Delay, s/veh	44.9				58.1			14.9			57.1	
Approach LOS	D				E			B			E	
Timer - Assigned Phs	2		4		5	6	7	8				
Phs Duration (G+Y+Rc), s	80.6		39.4		38.2	42.4	26.5	12.8				
Change Period (Y+Rc), s	* 5.7		* 6.1		* 5.7	* 5.6	* 6.1	* 6.1				
Max Green Setting (Gmax), s	* 67		* 41		* 13	* 49	* 24	* 11				
Max Q Clear Time (g_c+l1), s	12.4		4.6		4.3	32.7	20.4	6.7				
Green Ext Time (p_c), s	2.9		0.1		0.1	4.1	0.1	0.1				
Intersection Summary												
HCM 6th Ctrl Delay		39.6										
HCM 6th LOS		D										
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)

2025+P PM + UATP Mitigation



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	302	31	171	15	75	140	154	688	33	982
v/c Ratio	0.69	0.05	0.28	0.15	0.54	0.57	0.45	0.33	0.11	0.63
Control Delay	41.9	26.6	5.2	54.2	67.8	18.0	26.9	13.9	24.2	27.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	26.6	5.2	54.2	67.8	18.0	26.9	13.9	24.2	27.3
Queue Length 50th (ft)	186	16	0	11	57	0	53	143	15	296
Queue Length 95th (ft)	273	39	48	33	106	62	89	184	40	384
Internal Link Dist (ft)		589			263			309		573
Turn Bay Length (ft)	120		80	120		80	70		70	
Base Capacity (vph)	455	655	651	127	175	274	374	2124	295	1594
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.05	0.26	0.12	0.43	0.51	0.41	0.32	0.11	0.62

Intersection Summary

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
2030 PM + UATP Mitigation

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (veh/h)	312	32	160	16	80	147	132	721	5	35	729	299
Future Volume (veh/h)	312	32	160	16	80	147	132	721	5	35	729	299
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.99	0.94		0.92	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	335	34	32	17	86	2	142	775	5	38	784	281
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	415	563	470	138	117	91	466	2200	14	223	879	315
Arrive On Green	0.19	0.30	0.30	0.06	0.06	0.06	0.22	0.60	0.60	0.34	0.34	0.34
Sat Flow, veh/h	1795	1885	1575	1263	1885	1467	1795	3648	24	697	2578	924
Grp Volume(v), veh/h	335	34	32	17	86	2	142	380	400	38	544	521
Grp Sat Flow(s), veh/h/ln	1795	1885	1575	1263	1885	1467	1795	1791	1881	697	1791	1711
Q Serve(g_s), s	20.2	1.5	1.7	1.5	5.4	0.2	2.3	12.8	12.8	5.3	34.6	34.6
Cycle Q Clear(g_c), s	20.2	1.5	1.7	1.5	5.4	0.2	2.3	12.8	12.8	18.1	34.6	34.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.54
Lane Grp Cap(c), veh/h	415	563	470	138	117	91	466	1080	1134	223	610	583
V/C Ratio(X)	0.81	0.06	0.07	0.12	0.74	0.02	0.30	0.35	0.35	0.17	0.89	0.89
Avail Cap(c_a), veh/h	440	643	537	178	176	137	466	1080	1134	272	737	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	30.1	30.1	53.5	55.3	52.9	36.9	12.0	12.0	37.3	37.5	37.5
Incr Delay (d2), s/veh	9.2	0.0	0.0	0.1	3.4	0.0	0.1	0.9	0.9	1.7	17.8	18.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	10.0	0.7	0.7	0.5	2.7	0.1	3.4	5.3	5.5	1.0	18.0	17.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	49.4	30.1	30.2	53.7	58.7	52.9	37.0	12.9	12.9	38.9	55.3	56.0
LnGrp LOS	D	C	C	D	E	D	D	B	B	D	E	E
Approach Vol, veh/h	401				105			922			1103	
Approach Delay, s/veh	46.2				57.8			16.6			55.1	
Approach LOS	D				E			B			E	
Timer - Assigned Phs	2		4		5	6	7	8				
Phs Duration (G+Y+Rc), s	78.1		41.9		31.6	46.5	28.4	13.5				
Change Period (Y+Rc), s	* 5.7		* 6.1		* 5.7	* 5.6	* 6.1	* 6.1				
Max Green Setting (Gmax), s	* 67		* 41		* 13	* 49	* 24	* 11				
Max Q Clear Time (g_c+l1), s	14.8		3.7		4.3	36.6	22.2	7.4				
Green Ext Time (p_c), s	3.4		0.1		0.1	4.3	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay 39.8
HCM 6th LOS D

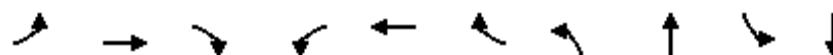
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)

2030 PM + UATP Mitigation



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	335	34	172	17	86	158	142	780	38	1106
v/c Ratio	0.73	0.06	0.28	0.16	0.60	0.59	0.49	0.38	0.16	0.72
Control Delay	43.4	26.2	5.2	54.3	70.1	17.5	32.8	15.1	25.2	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.4	26.2	5.2	54.3	70.1	17.5	32.8	15.1	25.2	30.3
Queue Length 50th (ft)	203	17	0	12	65	0	52	177	19	368
Queue Length 95th (ft)	306	41	48	36	119	65	82	214	45	451
Internal Link Dist (ft)		589			263			309		573
Turn Bay Length (ft)	120		80	120		80	70		70	
Base Capacity (vph)	467	659	655	126	175	290	322	2090	249	1561
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.05	0.26	0.13	0.49	0.54	0.44	0.37	0.15	0.71

Intersection Summary

HCM 6th Signalized Intersection Summary
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)
2030+P PM + UATP Mitigation

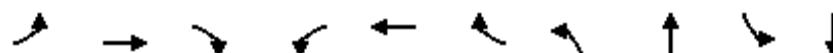
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (veh/h)	318	32	178	16	80	147	158	721	5	35	729	308
Future Volume (veh/h)	318	32	178	16	80	147	158	721	5	35	729	308
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.99	0.94		0.92	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	342	34	51	17	86	2	170	775	5	38	784	290
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	423	575	481	137	117	91	449	2176	14	224	877	324
Arrive On Green	0.19	0.31	0.31	0.06	0.06	0.06	0.21	0.60	0.60	0.34	0.34	0.34
Sat Flow, veh/h	1795	1885	1576	1243	1885	1467	1795	3648	24	697	2554	944
Grp Volume(v), veh/h	342	34	51	17	86	2	170	380	400	38	550	524
Grp Sat Flow(s), veh/h/ln	1795	1885	1576	1243	1885	1467	1795	1791	1881	697	1791	1707
Q Serve(g_s), s	20.7	1.5	2.8	1.6	5.4	0.2	4.1	13.1	13.1	5.3	34.9	34.9
Cycle Q Clear(g_c), s	20.7	1.5	2.8	1.6	5.4	0.2	4.1	13.1	13.1	18.4	34.9	34.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.55
Lane Grp Cap(c), veh/h	423	575	481	137	117	91	449	1068	1122	224	615	586
V/C Ratio(X)	0.81	0.06	0.11	0.12	0.74	0.02	0.38	0.36	0.36	0.17	0.89	0.89
Avail Cap(c_a), veh/h	435	643	537	176	176	137	449	1068	1122	271	737	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.0	29.5	29.9	53.5	55.3	52.9	38.2	12.4	12.4	37.2	37.3	37.3
Incr Delay (d2), s/veh	10.6	0.0	0.0	0.1	3.3	0.0	0.2	0.9	0.9	1.6	17.9	18.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	10.3	0.7	1.1	0.5	2.7	0.1	4.2	5.4	5.6	1.0	18.1	17.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	50.6	29.5	30.0	53.7	58.6	52.9	38.4	13.3	13.3	38.8	55.2	56.0
LnGrp LOS	D	C	C	D	E	D	D	B	B	D	E	E
Approach Vol, veh/h	427				105			950			1112	
Approach Delay, s/veh	46.5				57.7			17.8			55.0	
Approach LOS	D				E			B			D	
Timer - Assigned Phs	2		4		5	6	7	8				
Phs Duration (G+Y+Rc), s	77.3		42.7		30.5	46.8	29.2	13.5				
Change Period (Y+Rc), s	* 5.7		* 6.1		* 5.7	* 5.6	6.4	* 6.1				
Max Green Setting (Gmax), s	* 67		* 41		* 13	* 49	23.6	* 11				
Max Q Clear Time (g_c+l1), s	15.1		4.8		6.1	36.9	22.7	7.4				
Green Ext Time (p_c), s	3.4		0.1		0.1	4.3	0.1	0.1				
Intersection Summary												
HCM 6th Ctrl Delay		40.1										
HCM 6th LOS		D										
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
6: Hwy 2 & Larch St

North Boyer Development (Peer Review)

2030+P PM + UATP Mitigation



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	342	34	191	17	86	158	170	780	38	1115
v/c Ratio	0.74	0.05	0.30	0.16	0.60	0.59	0.58	0.38	0.16	0.75
Control Delay	43.9	26.5	5.2	54.3	70.1	17.5	39.3	15.3	25.4	31.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	26.5	5.2	54.3	70.1	17.5	39.3	15.3	25.4	31.8
Queue Length 50th (ft)	203	17	0	12	65	0	66	186	20	397
Queue Length 95th (ft)	314	41	50	36	119	65	101	214	45	455
Internal Link Dist (ft)		589			263			309		573
Turn Bay Length (ft)	120		80	120		80	70		70	
Base Capacity (vph)	467	655	664	126	175	290	312	2059	239	1518
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.05	0.29	0.13	0.49	0.54	0.54	0.38	0.16	0.73

Intersection Summary

1. The TIA assumes 133 single family dwelling units, 150 multifamily (low rise) dwelling units, 45,000 square feet of mini-warehouse use, and 10,000 square feet of retail shopping center space. The analysis was performed based upon these assumptions. Sheets 2, 3, and 4 of the preliminary plat detail lot sizes that meet single family dwelling units (consistent with current zoning) and therefore, if constructed, the assumptions applied to the TIA relating to the 133 single family dwelling units is relatively certain. The remaining assumptive uses would require a re-zone and certainty in these assumptions is therefore lower. (a) Is it accurate that if actual future uses vary from these use assumptions that the validity and conclusions of the TIA may also vary? (b) Is it accurate that the proposed uses represent a more conservative (higher volume of trips) than would be assumed for the same current zoning?

 - a. That is accurate. If actual future uses vary from the uses assumed in the TIS, then the validity of the conclusions in the TIS may also vary and we would recommend the TIS be updated with the new land use assumptions in that event.
 - b. That is accurate. Even though the multi-family housing and mini-warehouses typically generate fewer trips than single-family housing, the proposed retail land use is likely to generate enough trips so that the proposed land uses would generate more total trips than an exclusively single-family housing development.
2. The 2007 Sandpoint Urban Area Transportation Plan (UATP) outlines converting Mountain View Road to a Minor Arterial road by 2026 with a three-lane cross-section and additional bike/ped improvements. (a) Based upon current data and forecasts, is a three-lane cross-section on Mountain View warranted (now and/or in the future) without the proposed development? (b) Considering the proposed development, do you recommend Mountain View be improved to provide for a three-lane cross -section with bike/ped improvements?

 - a. As outlined in the TIS, Mountain View Road is currently a two-lane local road with a 25-mph speed limit and low traffic volumes. Without the project, a third lane along Mountain View Road does not appear to be justified by 2030. The classification conversion to a Minor Arterial also doesn't seem justified as this road does not provide intra-community travel and connect to a greater roadway network – a collector street classification seems more appropriate.
 - b. Even with the proposed project, the TIS showed that the intersections along Mountain View Road would operate acceptably without widening to include a two-way left-turn lane. Widening to three lanes does not appear to be justified by the addition of the project. Bike/ped improvements were not recommended based on the study. Mountain View Road currently has a multi-use path along the south side of the street to separate bike/ped traffic from vehicle traffic, so further improvements may not be necessary.

 - i. It is important that the development accommodate the existing multi-use path on the north and west edges of the project and enhance connectivity to those facilities.
 - ii. A crosswalk or other pavement markings may be justified on the east leg of the intersection at N Boyer Ave & Mountain View Rd to indicate to drivers that the multi-use path connects on both sides of Mountain View Rd.
3. Page 3 of the Memo states "*It should be noted that the TIS does not specify whether the 3.4% growth is based on a local travel demand model or based upon historical growth.*" Please clarify the difference and its relevance/importance.

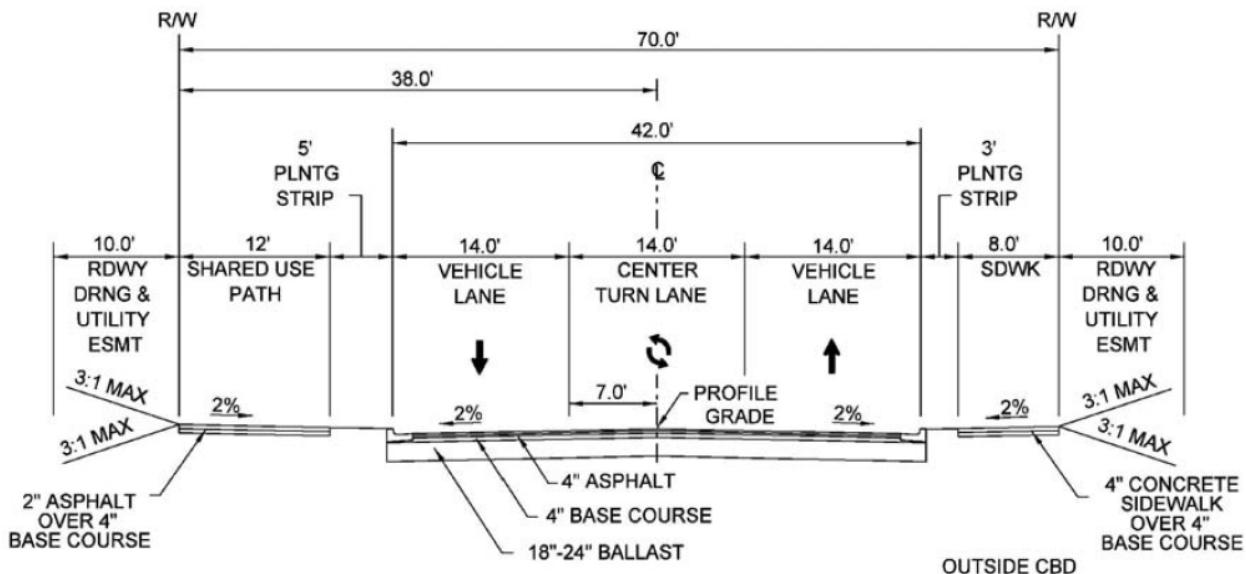
 - a. Forecasting future volumes based on historical growth is done by reviewing the growth in traffic in an area over a span of time (several years) and assuming a similar growth is

likely to continue moving forward. Travel demand models typically take specific planned projects and/or potential growth based on land use assumptions (according to what the area is zoned for) into account when projecting future traffic volumes and are likely to represent future traffic conditions more accurately than the historical growth. The more accurate the future traffic projections, the more accurate the analysis results and potential recommended mitigations will be.

4. Page 4 of the Memo states "*North Boyer Ave & Baldy Mountain Road is shown to experience unacceptable LOS in the 2025 and 2030 background PM peaks. The same intersection is shown to experience unacceptable LOS and V/C in the same plus horizon years.*" Further on the same page under "Capacity Improvements," a signal is contemplated at this intersection in the future. Page 48 of the TIS states "*If the North Boyer Ave/Baldy Mountain Road is signalized in the future, a study of the signal interactions with the rail crossing signal would be required.*" Is the study of interactions necessary to determine the viability of a signal, or is it probable that the interaction can be overcome and that the study is only helping to determine the method?
 - a. In short, the study should be for both. To implement a signal, the intersection should meet signalization warrants as outlined in the MUTCD. This would require a specific warrant analysis study in order to determine if the signal is necessary. This warrant may not be met until there is some level of traffic on the roadways already from the proposed developments in the area. Also, because of the proximity of the train crossing, the study should determine how to implement the signal to reduce the likelihood of a road vehicle stopping on the train tracks.
 - i. From an initial review of the intersection, one option would be to place the southbound signal mast arm north of the train crossing. In this case, the train crossing would need to be incorporated into the N Boyer Ave & Baldy Mountain Rd signal design and the signal would need to include preemptive detection to turn the signal to an all red phase when the train is crossing.
5. Page 49 of the TIA states "... sufficient capacity will be available to accommodate the North Boyer Development (University Park) provided signalization or roundabout controls. The intersection should be monitored and signal warrants conducted to ensure acceptable traffic operation/level of service is maintained. No additional mitigation is recommended by this development beyond site and frontage improvements. A two-way left turn lane is recommended along the project frontage on North Boyer Avenue." (a) The TIS appears to assume signalization over the roundabout (the UATP also contemplated a grade separated railroad crossing; do you concur that a signalized intersection is the most appropriate/best mitigation strategy to improve LOS at the North Boyer/Baldy intersection or is alternative method more appropriate (viable/cost effective)? (b) What are the recommended limits of the two-way left turn lane ("project frontage" is vague)?
 - a. From Fehr & Peers' initial evaluation, we agree that a signal is the preferred mitigation. To evaluate the particulars of the signal (e.g., queue lengths, signal operation, location of signal poles & mast arms, etc.) traffic simulation and concept signal design efforts should be performed.
 - i. Based on the proximity of the intersection to the train crossing, it is clear that a roundabout would likely not be a recommended mitigation due to the possibility that a southbound queue at the roundabout would spill back to the train crossing and the northbound queue from the train crossing could spill back through the roundabout and "lock it up." A grade-separated crossing may be

possible here but would be significantly more expensive than a signal at the intersection. Furthermore, in order for the grade-separation to work, the proposed bridge (or tunnel) would likely touch down well to the north and well to the south which would essentially render access to Baldy Mountain Rd (and possibly Ebbett Way) inaccessible unless there was a frontage road system to tie into. In addition, the grade-separated crossing may not address the failing LOS for the east/westbound movements at the intersection without additional mitigation (i.e. a signal or roundabout) or by closing the east/westbound legs altogether. A signal, when warranted, could preserve the existing geometry of the roadway and, as outlined in the TIS, improve the LOS at the intersection, while being less expensive than a grade-separated crossing. To reiterate the previous comments about the signal, the signal would need to be designed so that the signal system is tied into the train crossing so that the intersection is clear of vehicles when a train crosses.

- b. The project extends along North Boyer Avenue from the train crossing to Mountain View Road. The TIS is recommending a two-way left-turn lane that extends along that length of North Boyer Avenue from the train tracks to Mountain View Road.
6. The UATP contemplates North Boyer as a minor arterial (see Figure 7-HH). (a) What is the recommended cross-section of North Boyer Avenue from a multimodal, long-range planning perspective? (b) The preliminary plat, as proposed, would provide a total right-of-way width of 70-ft along North Boyer Ave; is this sufficient?
- a. The future bicycle/pedestrian network as shown in Figure 7-II of the UATP indicates that North Boyer Avenue is a typical class 1 bike path and includes a separated multi-use pathway. Figure 7-HH of the UATP indicates that North Boyer Avenue should be an “Arterial 3” or minor arterial through this area. The cross-section shown on page 7-13 (screenshot below) of the UATP indicate that Arterial 3 roads with a multi-use path require 70 feet of right of way (from the edge of the multi-use path to the edge of the sidewalk on the opposite side of the street), plus 10 feet of drainage & utility easement on either side.



- b. Therefore, 70 feet of right of way is only sufficient as long as the development provides 10 feet of easement outside of the shared use path on the east side of the road.
- 7. Page 42 of the TIA describes the applicant's methodology of "fair share contribution" of off-site improvements. (a) Is it correct that the calculation excludes the mini-warehouse and retail shopping uses? (b) Please confirm if the percentage of fair share was calculated based upon a peak hour, not ADT? (c) Is the proposed methodology consistent with standard industry practice? (d) Do you recommend an alternative method for calculating a project's responsibility towards improvements? (e) Do you concur with the 17.35% calculations or is an alternative value recommended?
 - a. Nothing in the TIS appears to indicate that the fair share contribution was calculated by excluding the mini-warehouse and retail shopping uses. The TIS takes all proposed project trips into account at the intersections in question.
 - b. The fair share calculation appears to be based on the PM peak hour since the signal at North Boyer Avenue & Baldy Mountain Road was found to be warranted in the PM peak hour, not based on ADT. The UATP does not specify whether fair share should be calculated based on Peak Hour or ADT, but to base fair share from ADT, daily intersection counts, and daily trip distribution would need to be compared.
 - c. Fehr & Peers is unfamiliar with the method outlined in the TIS for calculating fair share. Page 4 in the TIS Requirements in the UATP prescribes the method for calculating fair share of mitigations for areas affected by the project. "The project's proportionate share of an improvement is typically determined by dividing project trip assignments along a roadway section or at an intersection by total projected volumes." The method outlined in the UATP is consistent with standard industry practice, while the method outlined in the TIS does not appear to be.
 - i. While the method outlined in the UATP for calculating is considered acceptable, an alternative method to calculate fair share would be to divide the project trip assignments by the total increase from existing conditions. This method excludes the existing trips from the calculation and assigns the share of cost based on contribution to growth, rather than contribution to total traffic, and would place an increased burden on the development to address mitigation costs.
 - d. The method outlined in the UATP is appropriate for calculating fair share.
 - e. Based on that method and taking the worst of AM and PM, Fehr & Peers found that the fair share at North Boyer Avenue & Baldy Mountain Road should be about 21.84%. Furthermore, fair share at Hwy 2 & Larch Street (more on this below) is recommended to be about 2.45%. The calculations behind these recommendations are included in the recommendations memo for Task Order 3.
- 8. Are you able to provide an estimated cost of signalizing the North Boyer/Baldy? If so, is additional right-of-way required on Baldy to accommodate such improvements? Are improvements to the railroad tracks/operation anticipated to accommodate such improvements?
 - a. A broad planning level estimate for a traffic signal would typically be between \$300k-\$400k. A more specific cost estimate should be performed during the signal design phase. Based on aerial maps, it appears that there is enough right-of-way to appropriately accommodate a signal at this location. The signal and the train crossing will need to be coordinated together for this intersection to function efficiently and

safely – this will require preemption infrastructure to be placed so that the train crossing “talks” with the traffic signal.

9. Page 4 of the Memo states “*US-2 (Fifth Avenue) & Larch Street was also shown to experience failing V/C in 2030 background and background plus project conditions analyses.*” It does not appear that the TIA recommends mitigation(s) to improve the LOS at this location. Please clarify if the reason mitigation at this intersection was not proposed is because the TIS did not conclude that the project contributed/impacted the intersection’s performance? If not, what is the rationale for not proposing improvements and a fair-share contribution at this location?
 - a. Since the analysis presented in the TIS shows Hwy 2 & Larch St remaining LOS D or better in all scenarios, it does not include recommendations to mitigate the added delay. However, through independent modeling, Fehr & Peers found this intersection to be performing at LOS E in existing conditions and all future conditions, which would require mitigation. Further analysis of this intersection and its fair share contribution is included in the recommendations memo for Task Order 3.
10. The TIA (Tables 13 and 14) provides current and future LOS at a number of intersections with the project. Did your independent modeling verify the accuracy of the LOS reported in the TIA (background and future)?
 - a. Of the four intersections modeled to verify the accuracy of the LOS reported in the TIS, the two unsignalized intersections were found to be largely accurate, while the two signalized intersections had some discrepancies. The details of the similarities and differences between the analyses are outlined in the recommendations memo for Task Order 3.
11. City Council Resolution 09-39 adopted an intersection LOS of D. Please clarify the definition of an LOS of D. (a) Are the LOS provided in the TIA an average of all movements? (b) Is acceptability at LOS D consistent with industry standard/other jurisdictions? (c) The TIA provides that several intersections are anticipated to function at an LOS of D with the project conditions. As a result, is it reasonable/typical to require monitoring of actual conditions throughout the phasing of the development?
 - a. LOS describes the operating performance of an intersection or roadway. LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst. LOS D represents driving conditions that are approaching unstable flows but have tolerable delays. The Highway Capacity Manual, 6th Edition (HCM 6) methodology uses different quantitative evaluations for signalized and unsignalized intersections. For signalized and roundabout intersections, the LOS is provided for the overall intersection (weighted average of all approach delays), whereas for stop-controlled intersections, the LOS is provided for the worst movement.
 - b. LOS D is typically considered acceptable in most jurisdictions. Some rural or recreation areas prefer to use LOS C as the threshold for acceptability, but that is becoming more uncommon. Increasingly, LOS is being considered an outdated way of addressing impacts by itself – vehicle miles traveled (VMT) is becoming more of the standard (with LOS being included as a supplementary criteria) in states and areas where congestion is high.
 - c. We would recommend that the city require monitoring – either based on a certain number of years or based on completion of specific phases of the development (after X number of units or square footage is built). Monitoring is an appropriate way of

ensuring the development accurately assessed their impacts or not. Periodic monitoring will also help inform the city when certain mitigations are warranted.

12. Page 7 of the Memo, states "*Queue lengths at North Boyer Ave & US-2 appear to exceed capacity in the EB left, EB through, WB through, and SB through direction but are not addressed in the TIS.*" (a) Please clarify what the term "capacity" means in this case. (b) Is the capacity exceeded without the project; if not, what is the project's contribution? Table 14 reflects a 2030 LOS of C at this intersection with the project; please clarify the LOS and queuing capacity correlation (if none exists, please explain). (c) What is the recommended solution to improve capacity an intersection that is already signalized with potentially limited ROW?
 - a. In this instance, capacity is a measurement of the storage space for queueing vehicles for a particular turning movement at an intersection.
 - b. The TIS appears to only report queueing in the 2030 Plus Project condition for all intersections, except for Larch & Hwy 2, which was also reported for the 2030 Background condition. The capacity at that intersection appears to be exceeded in the WBT, NBL, and SBT movements in the 2030 Plus Project scenario. Further queueing analysis of the four independently modeled intersections is shown in the recommendations memo for Task Order 3.
 - i. LOS and queueing are both affected by conditions at the intersection, so when delay increases (i.e., vehicles spend more time stopped at the intersection) queuing typically increases. However, LOS is measured using predefined thresholds, whereas queuing capacity is determined by the geometry of each intersection movement.
 - c. If ROW is constrained, queueing can be reduced by altering the signal timing and re-allocating green time to the phase with the long queues or higher delay. If ROW is available, adding turn or through lanes or lengthening the existing turn lanes can serve to improve queueing conditions. Alternatively, instituting transportation demand management (TDM) strategies on a city-wide scale or development scale can help reduce vehicle trips.
13. Page 51 of the TIS states that the storage for the east bound left turn at the intersection of Larch Street at US-2 is anticipated to exceed capacity during Year 2030 Background PM Peak Hour as well as Year 2030 PM Background plus Project Conditions Peak Hour. Do you concur with the TIA that a fair share contribution is not warranted at this location? In other words, although the UATP contemplated a mid term project at this location, does the development volumes increase and/or change the limits of mitigation?
 - a. No, the excessive queueing should be mitigated. Furthermore, independent analysis of the intersection indicated that the LOS also exceeds acceptable limits, so the fair share analysis would need to be performed at that intersection to address those improvements anyway.
 - b. The mid-term project recommended in the UATP at Larch & Hwy 2 is to add a WB left turn bay and an EB right turn bay. During the independent analysis from Fehr & Peers, this intersection operated at LOS E in all PM conditions scenarios. The mitigations outlined in the UATP are appropriate and are recommended regardless of the project. In other words, the development volumes do not change the limits of mitigation. However, as outlined previously, the project does contribute to future volume growth at the intersection, so a fair share contribution is warranted at this location.

14. Page 7 of the Memo, states “*The added queuing analysis does not adequately address the train crossing.*” (a) Why and how should it be addressed? (b) What is the queuing distance with the project 2025/2030 during periods of train crossing?

- a. The TIS does not include analysis of the crossing itself. The TIS does include a statement about queueing at the intersections to the north and south of the crossing, but queues created by the crossing were not analyzed. Train crossings are not able to be adequately modeled using Synchro software, which is what was used in this analysis to evaluate most of the intersections. Train crossings should be modeled using simulation software like SimTraffic or Vissim to more accurately represent how queues will form when the crossing is blocked by the train.
 - i. Ideally a simulation analysis would be performed at this location, but it is likely that the result – signalizing the crossing of North Boyer Ave – would be the same. As mentioned previously, simulating the crossing and nearby intersections would serve to illustrate the interaction of the signal with the crossing and help direct the design of the signal.
- b. The queuing distance at the train crossing would need to be evaluated using simulation. Fehr & Peers cannot presently estimate the queuing distance during 2025/2030 plus project conditions but can perform this analysis should the City of Sandpoint give approval to do so; or, the City could require the developer/traffic consultant to address this more appropriately.

15. Is it necessary/ justifiable to provide mitigation strategies related to pedestrians and/or bicycles, such as crossings/signage/etc., as a result of the development?

- a. If the development impacts pedestrian or bicycle operation, then it would be justifiable to provide mitigation strategies. Furthermore, if a safety deficiency is discovered during the accident history portion of the analysis, then it would be appropriate to provide mitigation strategies for that as well. If the development is anticipated to increase demand for active transportation users (bikes and peds) then addressing how they will connect efficiently and safely to nearby and regional active transportation facilities (trails, paths, etc.) would be important.
16. The UATP provides various design standards, including Appendix G -Access Management. (a) Is the current, posted speed limit of 35 mph for a minor arterial acceptable post-development? (b) Do development volumes warrant exclusive right turn lanes?
- a. 35 mph is a typical speed limit for minor arterials and that seems to be an appropriate speed for this type of roadway. Any changes to the speed limit should be made based on recommendations from a separate speed study or from crash data that indicates speed is a contributing factor in collisions.
 - b. Based on ITD Traffic Manual Figure 3B-1 *Right-Turn Lane Warrant*, a northbound right turn appears to be warranted at the project driveway at Culver Drive. The right turn lane is shown to be warranted in both 2025 and 2030 plus-project conditions analyses in both AM and PM peak hours. Right turn lanes do not appear to be warranted at any other project driveways.